GAS JOURNAL

LIGHT ✂ HEAT ✂ POWER ✂ BYE-PRODUCTS

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VOL. CLXXXV., No. 3433.] WEDNESDAY, MARCH 6, 1929. [81ST YEAR.

Editorial Notes.

Analysis of the London Companies' Accounts.

By the courtesy of Mr. F. J. Bradfield, General Manager and Secretary of the Commercial Gas Company, we are able to publish the analysis of the Accounts of the principal London and Suburban Gas Companies for the past year. The analysis, originally compiled for the information of his Directors, has gradually become an institution among gas administrators; and several hundred copies are distributed each year. The analysis is not intended to compete with that standard work, Fields Analysis, now compiled by Mr. H. E. Ibbs, the Chief Accountant of the Gas Light and Coke Company, which has for over sixty years been the recognized authority on gas companies' records. The production of Mr. Bradfield's analysis so promptly after the close of each year makes it of inestimable value to all engaged in gas manufacture and distribution.

It will be noticed that for the first time the Hornsey and the Lea Bridge Companies have been included in the analysis. For some years gas company administrators have been aware of the excellent results obtained by these Companies; and their inclusion enhances the value of the analysis.

An important feature brought to light by the analysis is the general increase of the capital expenditure per therm compared with the year 1927, varying from 0·28d. per therm in the case of the Gas Light and Coke Company to 1·62d. in the case of the Wandsworth Company. The lowest figure is that of the Hornsey Company at 1s. 6·95d. per therm, and the highest Croydon at 2s. 2·34d. per therm. It should be pointed out that these costs are calculated on the amount expended and charged to the capital account, and do not include amounts added on conversion of stocks.

Comparing the price charged for gas during the last quarter of the year with that charged during the same period of 1927, the flat rate is lower in the case of all the companies; the greatest reduction being 1½d., to 7½d. per therm, by the Hornsey Company. This price is the lowest charged for gas to the ordinary consumers by any company in the London area since before the war.

With regard to the average gas receipts—*i.e., less* discounts and public lighting expenses—Hornsey, for the full year, was the lowest at 7·72d. per therm; and there follow the South Metropolitan at 8·24d.; Gas Light at 8·27d.; Commercial at 8·38d.; Wandsworth at 8·40d.; Tottenham at 8·70d.; Lea Bridge at 8·74d.; South Suburban at 9·24d.; and Croydon at 9·37d. per therm.

From the point of view of gas sales, the results will, having regard to the abnormally mild weather of 1928, be deemed satisfactory. Only in the case of one Company, that of the Commercial, with 2·03 p.ct. reduction, has there been any material decrease. Lea Bridge heads the list of increases with 3·62 p.ct. The percentage of unaccounted-for gas continues to show wide divergence between the Companies. The South Metropolitan Company is again the lowest with 2·26 p.ct., but Hornsey is a close second with 2·35 p.ct. There is little doubt that the saving effected by these low percentages of loss plays an important part in the financial results of these particular Companies.

With regard to the expenditure, the costs, of course, vary according to the position and size of the Company. For example, the compactness of the Hornsey district naturally reduces the distribution costs; the total expenditure under this head being 1·56d. per therm only. There are, however, many signs in the accounts of this Company of economical management; and the low cost of repairs to plant, 1·09d. per therm, is an instance of this. It is, of course, known that the distribution costs in central London are necessarily higher than in the suburbs. This is illustrated by the Commercial Company's figures. Whereas both for "net coals and oil" and for "net manufacture" that Company's costs were lower than any other company on the list, the heavier expenditure on meters and stoves, the majority of which are supplied to prepayment consumers, discounts the good manufacturing results.

All companies show an improved make of gas per ton of coal carbonized; the highest being the Lea Bridge Gas Company with a make of 75·82 therms. The Commercial Company still leads the way with 11·46 cwt. of coke made for sale per ton of coal; Lea Bridge shows the highest yield of tar at 14·88 galls. per ton of coal; and the South Metropolitan retains the lead with a make of 41·60 galls. (8 oz.) of ammoniacal liquor per ton of coal.

The cost of coal per ton in all Companies is appreciably lower; premier honours resting with the South Metropolitan Company at the low cost of 19s. 10·93d. per ton. Croydon shows the highest price obtained for coke at 22s. 11·39d. per ton, but the higher yields of the Hornsey and Commercial Companies give them the lead in respect of coke realized per ton of coal at 11s. 10·25d. and 11s. 9·48d. per ton respectively. The South Suburban realized the best price per gallon of tar at 4¾d., and the Commercial Company, as is usual, was much above its competitors with a price of 4s. 0·15d. per butt of liquor.

With regard to water gas, it will be seen that both the Lea Bridge and the Hornsey Companies manufactured a high percentage, 39·89 and 41·04 respectively; but these percentages and those of the other companies are slightly less than for the previous year.

The South Metropolitan and the South Suburban Companies top the list of the number of stoves to consumers, though the latter, with 114 p.ct., is slightly less than at the end of 1927.

Viewing the figures as a whole, it is clear that, though the mild weather has prejudiced gas sales, good progress has been made by all the companies as regards both working costs and manufacturing results.

Resourcefulness.

Every day, and in every way, the recent great frost must have taxed both the capacity of gas plant and the resourcefulness of gas engineers. Neither, so far as we have been able to discover, has been found wanting. There may be some tendency to take this as a matter of course; but that would not be fair. Only the best of plant and the most resourceful of brains could have successfully stood up to the severe test that has been imposed upon them. Over a weekly or a fortnightly period increases of from 30 to 50 p.ct., and even more, in output have been by no means uncommon; and only yesterday we heard of an instance in which on two separate days the quantity of gas sent out by an undertaking had been actually double what it was a year ago. No doubt something of the stress will, when the Board of Trade Returns relating to the present year come to be published, be reflected in the water gas percentages, in spite of any disabilities in connection with the price of oil, &c., that may exist. Unfortunately, however, these statistics will not be available for a long time to come—not until the hard February of 1929 has become a mere memory. It is our hope that before then many interesting experiences will have been recounted; and for this purpose the "Journal" pages are freely at the disposal of readers. There must be many intriguing episodes to come to light.

One great question to be answered (later on) is with regard to the attitude of the gas-consuming public towards the bigger gas bills; for, as is pointed out by Mr. J. F. Tyndall, of Deal, in our correspondence column to-day, these abnormal increases in output have got to be paid for. Will the consumer be shocked; or will he, as long ahead as April, be still overflowing with a sense of gratitude to his gas undertaking for invaluable help rendered—perhaps when disease had settled in his house, certainly during periods which would without its aid have been replete with discomfort? Is it placing the matter too high to reflect for one moment upon the fact that in many and many an instance the regular, unfailing warmth of a gas fire has in all probability been the means of warding off the most dreaded of all visitations? Is all this, in the course of a few weeks, to be forgotten; and is there to be no remembrance of the debt owed to that powerful ally which, by its ever ready service, has been helping the community to grapple with an insidious and relentless foe? We hope not; but in harbouring this hope we may be unduly optimistic.

Mr. Tyndall, at any rate, has not risked being the victim of illusion in this matter; for he keeps in mind the proverbially short-lived memories of the public when it comes to "paying the piper." This, it will be recalled, was one of the main objects—if not actually the main object—which induced the South Metropolitan Gas Company to embark upon the new system of monthly accounts—with highly gratifying results. Mr. Tyndall does not tell us that his recognition of this human weakness when it comes to the honouring of obligations has induced him to adopt monthly accounts; but it has led him to give proof of his resourcefulness in another direction. Knowing that to be forewarned is to be forearmed, he is supplying to his rental clerks and collectors, ready for the March accounts, the output of gas on the corresponding days of 1928 and 1929, the increased output both in volume and percentage, and a reminding note. Glancing at this table, showing how the great frost affected the output of gas from the Deal Gas-Works, one must readily admit that it provides a powerful weapon with which to knock the bottom out of complaints; and we would ask Mr. Tyndall later on to complete his story by informing us, for the benefit of our readers, as to the success by which his action may have been attended.

Further evidence of resourcefulness is furnished in the news pages of this issue of the "Journal," wherein it is recorded that to all the ordinary consumers of the Wandsworth, Wimbledon, and Epsom District Gas Company there have been delivered by hand notices pointing out that for many days the output of gas approximated 40 p.ct. more than at any other time in the Company's history. This exceptional demand has been successfully met—but again, "this larger use of gas will entail an increase in the accounts." To prevent questions subsequently arising, and to inform their customers of the state of affairs, the Company offer, on receipt of an enclosed postcard, to read the index of a consumer's meter, and to render an account up to the date of this special reading. The object of this special provision is to be of service to any consumers who may wish to know their consumption up to date; and it is gratifying to learn that, not only have the Company had many requests from consumers to have their meters read, but in several instances they have had letters of appreciation of the suggestion.

We are pleased to note the resourcefulness of both these undertakings as manifested by their executives. Students of human nature usually have little faith in long remembrance of favours conferred, though this does not necessarily mean that they are in agreement with the cynic who described gratitude as "a lively sense of favours to come."

Attention to Detail.

If one had to study the chief secret of success of great leaders and administrators in history—and this, of course, applies with equal force to the present great industrialists and social workers—one would find almost invariably the unusual combination of soaring imagination and amazing grasp of detail. And if one had to penetrate into the operations of any prosperous and efficient business organization of to-day, one would have one dominant impression—that concentration was directed to every phase of the composite process, that no detail was too small to merit close and sustained attention. Coming to our own industry, it might be asked of several gas undertakings how it is that they carry out their work of gas manufacture with such markedly good results. We do not think we are far wrong in suggesting that here again the general secret is to be found in persistent attention to each detail of the carbonizing process.

Certainly the renowned efficiency of the South Metropolitan Gas Company is a matter of constant effort, not one of pot luck. This is demonstrated thoroughly in a paper (published in full in our issue to-day) read by Mr. H. C. Sims before the London and Southern District Junior Gas Association on Feb. 22. The system of works inspection which he described has been in vogue in the Company since 1919, when, by reason of the impossibility of building fresh plant, steps had to be taken to obtain the best work out of the old. The benefits of early endeavours in this direction were so considerable that there is now a special inspection staff whose duty it is to detect any defects that may arise in the retort benches and subsidiary apparatus, in stoking machines and their minor components, in the retort house governors, in producers, elevators, coke plant, and so on. The various sources of waste are carefully considered by Mr. Sims; but we may remark incidentally that this inspection is an excellent training for young assistants.

"Every mickle makes a muckle;" and in the extraordinary care such as that taken by the South Metropolitan Gas Company over each detail in the process of gas manufacture lies the secret of the success which has been achieved by the National Institute of Industrial Psychology. It may not be generally known that for four years the Institute have been busy effecting improvements at one of the largest gas undertakings in this country, and that their efforts have been so beneficial, alike to the management and the employees, that their services have been retained at any rate for a further four years. On Feb. 20, at the Offices of the Institute in Aldwych House—on which occasion, by the way, the announcement was made of a contribution to the Institute of £10,000 from the estate of the late Mr. C. Heath Clark, for the promotion of education in London—a film was shown picturing the improvements the Institute have made in this particular gas concern.

It is not our intention here to detail all these better methods, the aim of each of which is the tripartite one of lowering the cost of production, increasing the output of work, and—by no means least important—securing for

the worker pleasanter conditions. Mention may be made, however, of two phases of the Institute's investigations; one in the retort house, the other in the workshops. In regard to the former, alterations to the length and shape of scurfing tools have resulted in quicker and more effective work; systematic stacking of general retort tools has eliminated much hitherto wasted time; new arrangements for coupling the hydraulic hose to charging and discharging machines have obviated unnecessary labour and quickened the whole operation; and the adoption of heat-resisting garments, fashioned after careful considerations of working conditions, has brought unaccustomed comfort to the stokers. All these small points are in themselves matters of common sense; and they are simple and obvious when explained or when portrayed, as they were on Feb. 20, on the screen. The crux of the situation, however, is that in the ordinary way they may be overlooked. The gas manager of to-day often has his time so fully occupied that it is impossible for him to devote the care and attention to detail so desirable—and, indeed, so necessary—for meticulously efficient practice.

In the workshops of this gas undertaking all sorts of minor points have been studied. For instance, the work in assembling gas fires has been reduced in astonishing proportion by the adoption of a turntable, and time taken in the manufacture of fire-backs has been lessened by the design of a single tool that eliminates much of the drudgery which formerly characterized the work. And all these small improvements have a definite psychological effect on the workmen themselves. Their outlook is brighter, and their movements quicker, because they appreciate that their problems are being attacked from their own viewpoint. As Dr. C. S. Myers, the Director of the Institute, observed on Feb. 20 prior to the screening of the film, the Institute owe their success in part to their impartiality as between labour and management, and in part to the recognition of individual mental and physical differences. There are, he suggested, differences in the incentives which appeal to people; and higher wages do not constitute the sole appeal.

Effective Advertising.

Electricians met, as did gas engineers, in large numbers at the British Industries Fair, and a conference was held under the auspices of the British Electrical Development Association, at which Lieut.-Col. W. A. Vignoles, D.S.O., Director and Secretary of the Association, delivered an address. The electrical industry is making great efforts to secure new business; but he does not appear to be satisfied with the results, for he said that, taking the domestic field alone, less than 25 p.ct. of the houses at present in the area of supply of existing undertakings seem to be connected to the electric cables. If this be so, there is certainly the great field for development to which the speaker drew attention. In the electricity supply areas of Great Britain there are 7,000,000 houses; while the estimated number of consumers is 1,600,000. What is to be done? Lieut.-Col. Vignoles evidently thinks the electricians would do well to emulate our own industry and its national publicity organization, for he is reported as having said: "At the Fair on the previous day he had heard a speaker at a gas industry luncheon state that that industry was too modest, and did not adequately push its claims. The British Commercial Gas Association was, however, spending about £100,000 per annum in trying to overcome that modesty. The fact should be borne in mind that the electrical industry had to contend with an enormous gas propaganda; and it would be well if the electrical industry followed the lead of the Gas Association in relation to effective advertising." Recognition of this kind at the hands of the industry's strongest competitor affords the best proof of the excellence of the work accomplished by the "B.C.G.A."

Artistic Gas Lighting.

Large numbers of readers of the "JOURNAL" will be going to Olympia during the next fortnight, while the "Daily Mail" Ideal Home Exhibition will remain open; and they will find much there which they should see. The Exhibition itself is, of course, a remarkable enterprise; and as the years pass—this, by the way, is the "coming-of-age" year—improvements are made by the organizers which in one direction or another render the display still more effective than before. For one thing, on the present occasion a uniform scheme has been adopted for the shells of the stands and the exterior colouring. This is a great improvement, which reminds one immediately of the Gas Industries Section at the Castle Bromwich Fair. However, with all that there is to see, the "JOURNAL" reader will make his way first to the Joint Exhibit of the London Gas Companies in the Main Hall, and then to the two gas-lighted homes in the Housing Section, the equipment of which is described in this issue. We would ask him, while making his inspection, to note specially the artistic gas lighting which is to be seen. Reference is made to it in our article descriptive of the Exhibition; but this note is added because of the great importance of full recognition of what gas can do under the best conditions. There is some excellent electrical equipment to be found in the Exhibition; but nothing has come to our notice which takes precedence of the gas lighting to which we now invite the attention of our readers.

The Manchester Institution.

In this issue will be found the first contribution to the 1929 Transactions of the District Gas Associations. Though but one year separates the Manchester Institution from its Diamond Jubilee, its virility shows no sign of decline, if one may judge from our annual record of its proceedings and such discussions as followed the Presidential Address last week. Incidentally, Mr. W. B. McLusky, of Halifax, the new President, merits the gratitude of all for quashing his prerogative and throwing his address open to discussion, for he dealt with the weighty—and, in view of growing competition, the increasingly grave—matter of gas charges. The report is now being set in type; and our readers will learn next week that, while individual gas men in the Manchester District differ widely in their methods, nevertheless the consensus of opinion is that differential charges are practically a *sine quâ non* in the scheme of defence.

Mr. Wm. Rogerson.

It will be recalled that at the last October meeting of the Manchester Institution the members received with keen regret the news that Mr. Rogerson, who was feeling the effect of illness and other anxiety, desired relief from the duties of the Secretaryship, which he had shouldered for nearly eight years. His successor, Mr. James Bridge, was to have assumed office this week; but convalescence after a regrettable accident has postponed his taking-over. Thus Mr. Rogerson was in his accustomed place when he received a handsome memento of his services to the Institution. This took the form of a chiming clock, while Mrs. Rogerson also received a gift from her many friends.

The Scottish Juniors.

Congratulations to the Scottish Junior Gas Association, of which the Western and the Eastern Districts this year celebrate their twenty-fifth birthday. In April, 1904, the late Mr. Henry O'Connor, who at that time had charge of the Gas Engineering Department of Messrs. James Milne & Sons, Ltd., convened a meeting for promoting a Junior Gas Association in Scotland. Mr. W. R. Herring, then Engineer to the Edinburgh Corporation, was to have taken the Chair; but in his unavoidable absence the honour fell to Mr. Alex. Wilson, the Glasgow Chief. At that meeting many sapient remarks were made, which revealed the realization of the need for foresight in the industry, and liberality on the part of "seniors" in the treatment of the "juniors" of the day. It was clear, however, that difficulties of travel made it impossible for a Junior Association in one unit to meet the needs of the whole country; and accordingly the outline was drawn of the Scottish Juniors as they are constituted to-day. Mr. Henry Rule, then Assistant Manager to the Falkirk Gas Department, being asked to undertake the Secretaryship of the Edinburgh District, became the Association's first Officer. Organization of the Western District commenced a fortnight later, with a crowded meeting called by Mr. James Lowe, of Glasgow; and Mr. W. M. Mason

was appointed Secretary. Thus, under the Presidency of Mr. Masterton in the East and Mr. Lowe in the West, the excellent work of the Districts was commenced; and our hope is that it will long continue.

The Destruction of a Berlin Gasholder.

Serious mishaps to gasholders are, fortunately, of rare occurrence, and the industry will await with interest the findings of a Committee of Investigation which has been appointed to inquire into the causes of the demolition by explosion of a million-and-a-quarter holder in Berlin. There is so far little information available beyond the bare reports issued by the Municipality, but a noteworthy feature of these is the statement that there were features of the mishap which have no known precedent in the whole history of gas supply. In some quarters it is surmised that the trouble originated in the fracturing of an underground pipe during the severe frost which prevailed at the time. The holder was enclosed in a brickwork structure, and there is apparently little doubt that the mixture which gave rise to the explosion was formed somehow in the space between the holder itself and its house. It is the irony of fate if the costly precautions of the erectors to protect the holder against general conditions were the cause of its final destruction in collaboration with the particular kind of weather which has visited Europe this winter. It will be interesting to hear whether this theory is confirmed by the investigators, and what are their theories as to the cause of the ignition.

Gas Industries Section at the "B.I.F."

From the Gas Industries Section at the British Industries Fair good reports of satisfactory inquiries made and orders booked were received from exhibitors. It is recognized by exhibitors, however, that actual orders booked during the Fair are no criterion of the benefits gained by participation in the event. A truer index of the feeling of exhibitors is provided by the fact that the majority expressed their willingness to engage space again for next year; and in several instances considerably larger stand area has been asked for. The attendance of buyers was excellent, and expressions of approval were heard on all sides of the colour scheme adopted and of the convenience of a Central Information Bureau for the Section. There was little doubt that, with the increasing size of the Fair, the system of sub-division into definite groups would be of the utmost value to buyers and exhibitors alike. The Gas Section are to be congratulated on the efforts made by the central authorities of the Gas Industry to ensure the attendance of engineers and buyers; and the work done in this direction was ably seconded by the exhibiting firms, who took great care that their stands should be staffed by responsible attendants. In many instances directors and proprietors were in personal attendance throughout the Fair period.

PERSONAL.

Mr. A. J. Mumford succeeded Mr. A. W. Brookes as Secretary of the British Gas Light Company, Ltd., as from March 1. Mr. Mumford was appointed at a meeting of the Court of Directors which was held on Feb. 27.

The list of New Year Honours included a Knighthood for Edward J. Holland, D.L., J.P., Chairman of the Sutton Gas Company—a well-merited recognition of his public services for the County of Surrey.

OBITUARY.

Mr. W. Fendick, Manager and Collector of the Hemel Hempsted District Gas Company, died in a London Nursing Home on Wednesday last. Following a private service at the Gas-Works House, the interment took place at the Broadway Church, Bourne End, Boxmoor, yesterday.

We are informed by Messrs. William Coward & Co., Ltd., the London Agents for the City of Perth, Western Australia, that Mr. C. E. Crocker, General Manager of the Gas and Electricity Department, lost his life in a serious motor accident on March 4. Friends of Mr. Crocker in this country will learn with sorrow of this tragic occurrence, which has cut short a career of exceptional success and much future promise.

GAS STOCK AND SHARE MARKET.

[For Stock and Share List, see later page.]

While the general depression on the Stock Exchange was a little less pronounced last week, conditions still remained dull and uninteresting. There seems to be no prospect of any appreciable improvement in the gilt-edged market while the Bank Rate keeps at its present high level. Nervousness regarding the General Election is also a retarding factor. Inquiries made in the various markets all brought the same reply—prices on a downward grade. The only bright feature was a recovery in Oil shares on the advance in the price of petrol.

Gas stocks and shares were steady; and although there were some improvements, noticeably a rise of 2 points each in the Cardiff consolidated to 97-100 and in Montevideo ordinary to 99-102, there was a reaction in the values of the Continental Companies' shares. Continental Union dropped 5 points to 120-130; European eased off ½ point to 17½-19½; and Imperial Continental fell 25 points to 385-405. Primitiva also declined by 3s. 6d. to 32s. 6d.-34s. 6d.

Further satisfactory dividend announcements have been made. The North Middlesex Company is paying 3s. more at £7 1s. p.c. per annum for the past half-year; Hastings 5s. more at £7 p.c. per annum, and £5 10s. p.c. per annum on the two ordinary stocks; and the Brighton Company maintain their dividends at £7 10s. p.c. per annum and £6 15s. p.c. per annum on the 6 p.c. and 5 p.c. stocks respectively.

While Gas Stocks have of late recovered a good deal of their former popularity, the quotations of the various companies' stocks are still substantially below the quotations prior to the war, and, after taking into account the change in the value of money, there is still plenty of room for improvement. For instance, in March, 1914, the Gas Light ordinary stood at 100-102 on a dividend of £4 17s. 4d. p.c., whereas the present price is equivalent to 95-97½ on a dividend of £5 11s. p.c.

The following transactions were recorded during the week:

On Monday, Cardiff 7½ p.c. deb. 102½, 103, Commercial 99½, Continental Union 125, 127, 128½, European 19, 19⅛, 19⅜, 19½, 19⅝, 19¾, 19⅞, 20, Gas Light and Coke 19s. 3d., 19s. 4½d., 19s. 6d., 19s. 7½d., 19s. 9d., 3½ p.c. max. 65, 3 p.c. deb. 59⅜, 60¾, 5 p.c. deb. 101¾, Imperial Continental 410, 411, 412, 413, 415, 416, 417, 418, 419, 420, 420½, 421, 422, 423, Primitiva 34s. 9d., 34s. 10½d., 35s., 35s. 4½d., 35s. 6d., 35s. 9d., 35s. 10½d., 36s., 36s. 1½d., 36s. 3d., 36s. 6d., 36s. 9d., 37s., 37s. 9d., South Metropolitan 106½, 107, 107½, South Suburban 107, 109, Southampton 5 p.c. 78½, 4 p.c. deb. 73.

On Tuesday, Alliance and Dublin 101½, Commercial 98, 99, Continental Union 127, European 18¾, 19, 19¼, 19½, 19¾, 19⅞, 20, 20¼, Gas Light and Coke 19s. 4½d., 19s. 6d., 19s. 7½d., 19s. 9d., 3 p.c. deb. 59¾, Imperial Continental 390, 392, 395, 400, 402½, 405, 410, Newcastle 3½ p.c. 18s. 6d., Primitiva 31s., 31s. 6d., 32s., 32s. 6d., 33s., 33s. 6d., 34s., 34s. 6d., 34s. 9d., South Metropolitan 3 p.c. deb. 60½, South Suburban 5 p.c. 109, Southampton 4 p.c. deb. 74.

On Wednesday, Continental Union 119, 121, 122, European 18¼, 18½, 18¾, 19, 19¼, 19⅜, Gas Light and Coke 19s. 3d., 19s. 4½d., 19s. 6d., 19s. 7½d., 5 p.c. deb. 101¼, Imperial Continental 370, 372, 373, 375, 377, 378, 380, 381, 382, 382½, 385, 386, 387, 390, 391, 392, 395, 402, Newcastle 3½ p.c. 16s. 4½d., Primitiva 32s. 6d., 32s. 9d., 32s. 10½d., 33s., 33s. 3d., 33s. 6d., 33s. 7½d., 33s. 9d., 34s., 34s. 3d., South Metropolitan 6 p.c. pref. 110, 6½ p.c. deb. 101½, Southampton 5 p.c. 79½.

On Thursday, Alliance and Dublin 100⅜, 101½, Bournemouth 5 p.c. 13½, 4 p.c. deb. 75, Colonial 26s., Commercial 99, Continental Union 118, 120, 122, 123, 125, 126, 127, European 17⅞, 18, £18 1s., 18⅛, 18⅛, 18¼, 18½, 18¾, 19¾ Gas Light and Coke 19s. 3d., 19s. 6d., 3½ p.c. 64½, 65½, 5 p.c. deb. 101¼, Imperial Continental 385, 386, 387, 389½, 390, 391, 392, 393, 394, 395, 396, 397, 398, 400, Malta and Mediterranean 5⅞, Newcastle 3½ p.c. 17s., Oriental 117¾, Portsmouth 4 p.c. 114, 5 p.c. 82, Primitiva 32s. 9d., 33s., 33s. 6d., 33s. 7½d., 33s. 9d., South Metropolitan 106¾, 107, 6½ p.c. deb. 101½, South Suburban 5 p.c. 109, Tottenham 3½ p.c. 104½, Wandsworth "B" 125, new 105. Supplementary prices, Tottenham 5 p.c. registered mortgages 97.

On Friday, Bournemouth 4 p.c. deb. 76, Commercial 98½, 99, Continental Union 122, 124½, 125, 126, 127, European 17⅛, £18 1s., 18⅛, 18¼, 18⅜, 18½, 18⅝, 18¾, Gas Light and Coke 19s., 19s. 3d., 19s. 4½d., 19s. 6d., 4 p.c. pref. 77½, 5 p.c. deb. 101¼, 101⅜, Imperial Continental 390, 391, 392, 393, 393½, 395, 398, 399, 400, 401, 402, 403, 405, Primitiva 32s. 6d., 32s. 9d., 33s., 33s. 3d., 33s. 4½d., 33s. 6d., 33s. 9d., 4 p.c. con. deb. 79½,

4 p.ct. deb. (1911) 79½, South Metropolitan 106½, 106¾, 107, 107½, Tottenham 3½ p.ct. 103½, Wandsworth "B" 127, new 105. Supplementary prices, Malta and Mediterranean 2nd 7½ p.ct. pref. 5, Tottenham 5 p.ct. mortgages 99.

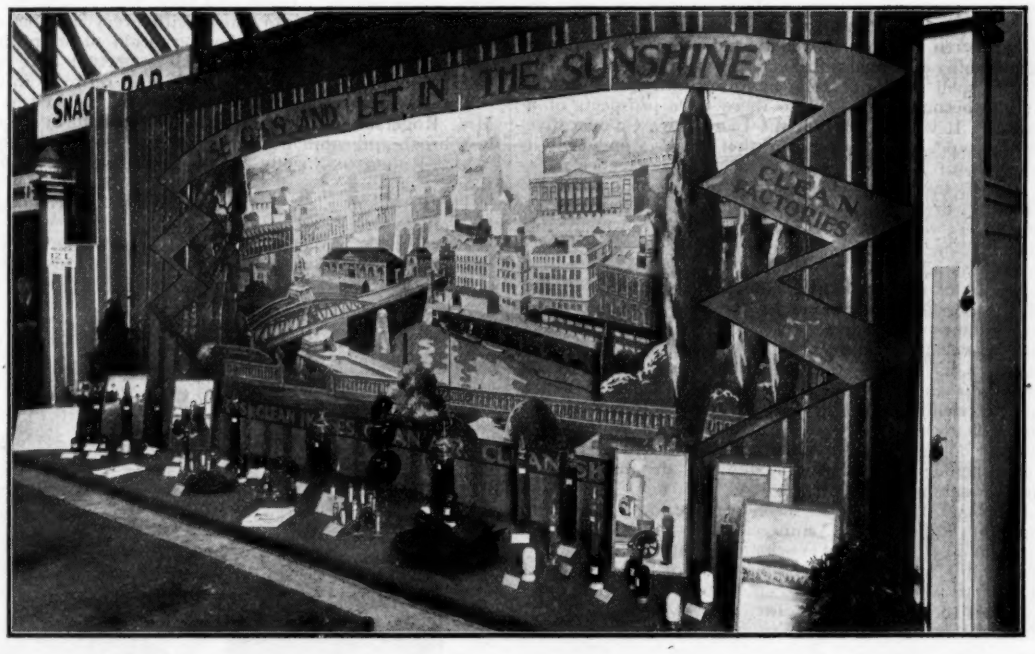
Credits were abundant in Lombard Street at the close of the week. New money for the night was available at from 4 p.ct. down to 3½ p.ct. Renewals, however, were mostly charged at 4 p.ct. Discount rates were inclined to be easier in tendency; but this was subsequently corrected on the Treasury Bill announcement of the higher average rate of £5 4s. 6·06d. p.ct., or about 9¼d. p.ct. above that for the previous week.

Foreign Exchanges moved within narrow limits. Sterling on New York rose slightly to 4.85¼. French francs were lower at 124.23, but Belgian currency was higher at 34.94¼. Both Italian and Dutch exchanges were cheaper at 92.65½ and 12.11⅜ respectively, and Spanish pesetas closed 10c. lower at 31.72½.

Silver reacted after its recent advance, and closed at 26d. per oz.; while Gold remained at 84s. 11½d. per oz.

The Bank Rate is 5½ p.ct., to which it was raised from 4½ p.ct. on Feb. 7. The Banks' deposit rate is 3½ p.ct., and the deposit rates of the discount houses are 3½ p.ct. at call and 3¾ p.ct. at notice.

BRITISH INDUSTRIES FAIR, BIRMINGHAM.



PROPAGANDA.

The following statement on the achievements of the heavy section of the British Industries Fair was made by Mr. R. C. Rodgers, President of the Birmingham Chamber of Commerce (which is responsible for the management of the Fair) at the close on Friday night.

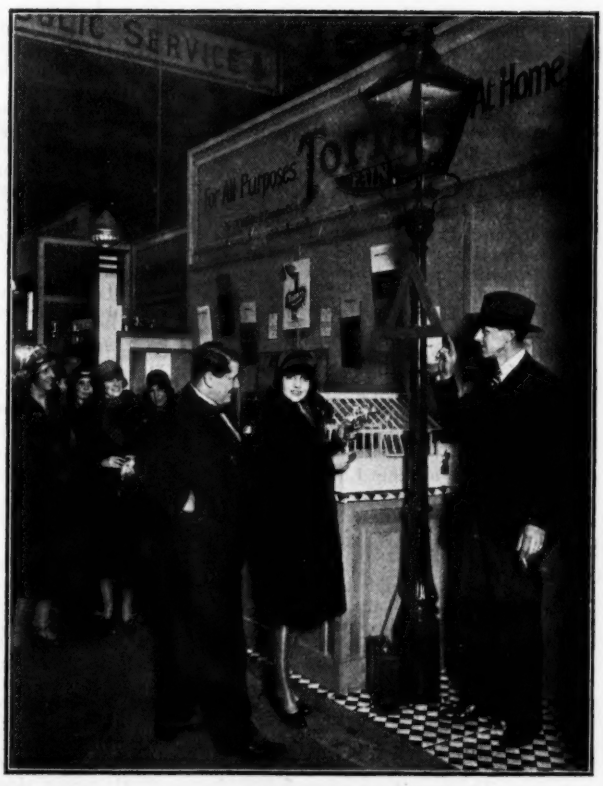
"I do not think it can be questioned that the Fair this year has been the most successful of the series. During the past eleven days I have been in close contact with a large number of exhibitors, and have obtained much information. Upon that information I have formed the definite opinion—which is confirmed by my colleagues on the Fair Management Committee—that the amount of actual business done has been entirely satisfactory, and that the number of trade inquiries have been largely in excess of last year. Already many of the exhibitors have applied for increased space for 1930, and everything points to the fact that the exhibition buildings must be still further extended. What the extent of the increased accommodation will need to be depends on the exhibitors themselves; but it is of the first importance that they should make their demands known at the earliest possible moment.

"The Chamber of Commerce have willingly faced extensions costing £30,000 in each of the last two years. The Chamber are prepared to make adequate provision for space in 1930, but I would point out that seven months before the present Fair in Birmingham every foot of space was let. For this 1929 Fair there were 300 manufacturers on the waiting list, all of whom had to be refused space.

"I am satisfied in my own mind that this Heavy Industries Fair is well on the way to establishing itself as one of the greatest practical assets to British production which has ever been created. It is becoming recognized as the annual trade event which wholesale and retail distributors must take into account as the guiding factor in making their plans for the year.

"This view of the inevitable development of the British Industries Fair is confirmed by the official visit I paid to the White City Section in London. The Fair, as a whole, has taken deep root. Both sections together form a complete fair of the industries which make up our productive earning capacity as a nation.

"In 1930, we are all looking forward—exhibitors, buyers, and management—to a still more remarkable record of business."



Mr. Basil Foster and the Caste of "A Damsel in Distress" discuss with Mr. Freeman Burrows a little matter of "paint."

MANCHESTER DISTRICT INSTITUTION OF GAS ENGINEERS.

Fifty-Ninth Annual Meeting.

The Fifty-Ninth Annual Meeting of the Manchester District Institution of Gas Engineers was held on Friday, March 1, at the Midland Hotel, Manchester—Mr. R. H. Ginman (Leek) presiding at the opening of the proceedings.

One item in the programme was the induction of three new members, Messrs. H. B. Holliday (Wallasey), T. Crowdy (Kendal), and S. B. Dean (Batley). Mr. Dean was present, and was given a cordial welcome by the President and the members.

The annual report and statement of accounts were taken as read, and were adopted without discussion.

Mr. W. J. Smith (Bolton) moved the adoption of the report of the Lancashire Commercial Section. He remarked that since the cold spell stocks of coke in this country and on the Continent had become very low, so there were prospects of a better market. It was hoped that the Lancashire Co-operative Tar Scheme would be put into operation shortly, and that it would bring about a better price, or at all events check the tendency to a further fall. He observed that, on the death of Mr. S. Meunier, of Stockport, who had been the Chairman of the Section for 25 years, he (Mr. Smith) was elected to fill the vacant place.

The report was adopted.

Mr. E. H. Hudson (Normanton) moved the adoption of the report of the Yorkshire Commercial Section. He expressed regret that some members did not support the Section as they should do. Every gas engineer in Lancashire and Yorkshire should support his respective Commercial Section by attending the meetings and contributing to the discussions. Having had some experience of a Tar Scheme, he could assure his Lancashire friends that they were going on the right lines. Tar prices had not improved in Yorkshire, but this was not due to the Tar Scheme; it was brought about by the over-production of tar throughout the world.

Mr. C. S. Shapley (Leeds), in seconding the motion, said he noted that the Lancashire Commercial Section had a cash balance of £96 15s. 7d. The Yorkshire Commercial Section had contributed £20 to the Benevolent Fund of the Institution of Gas Engineers—a fund which could always do with more support. Then the Section had contributed £150 towards the cost of research for the purpose of evolving means of improving the revenue from ammonia. Research was a very expensive hobby. He commended this also to the attention of their Lancashire friends, for he was sure everyone present would be glad to see an improvement in the revenue from ammonia. Compared with what used to be obtained, there had been a great drop. At Leeds the revenue had come down from 3½d. per 1000 c.ft. to somewhere about a farthing. This state of things could be improved, but only if there was co-operation in the matter of providing funds.

The President said he would like to pay a tribute to the excellent work done by the two Sections, and the very handsome contribution by Yorkshire to research work in connection with ammoniacal liquor. With smaller undertakings at considerable distances from tar distillation plants, ammonia had ceased to be a source of revenue, and had, indeed, become an anxiety and a cause of expense.

The motion was carried unanimously.

Recommendations by the Committee that the usual sum of 10 guineas be granted to the Benevolent Fund of the Institution of Gas Engineers, and in addition a special donation of 10 guineas, were agreed to.

The President moved the adoption of other recommendations by the Committee: That Mr. W. B. McLusky (Halifax) be appointed the Representative of the District Institution on the Council of the Institution of Gas Engineers. That Messrs. W. Buckley (Manchester) and W. B. McLusky (Halifax) be appointed Representatives of the Manchester Institution on the Councils of the Lancashire and Yorkshire Junior Gas Associations, respectively.

Mr. W. M. Carr (Stretford) seconded the motion, and it was agreed to.

Presentation to Mr. Rogerson.

The President said that Mr. J. Bridge, of Elland, who was elected to take the place of Mr. Rogerson as Hon. Secretary and Treasurer, had sustained a serious accident; and though he had recovered from the direct effects of that accident, he was unable to undertake the duties of his post, and could not be present at this meeting. Mr. Rogerson had offered to carry on until such time as Mr. Bridge was restored to perfect health. Mr. Rogerson had now been Secretary for eight years. He followed Mr. Frith, and another predecessor was Mr. Kendrick. The Institution had been well served in the past by its Secretaries. The members appreciated the work that was done, and realized that in many cases the greatest part of it happened behind the scenes. It was right that some acknowledgment should be made of Mr. Rogerson's services; and the Council had taken a suitable sum from the funds to defray the cost of a mahogany timepiece with Westminster chimes—a very handsome piece of furniture. He had the greatest pleasure in asking Mr. Rogerson to accept it. (Applause.) The inscription ran: "Presented to William Rogerson by the members of the Manchester District Institution of Gas Engineers as a token of appreciation of his services as Hon. Secretary and Treasurer of the Institution, 1922 to 1929."

Mr. Rogerson said that his eight years of office had been a very happy period. There had been plenty of work to do, but it had brought him into touch with every member of the Institution, and had led to the formation of friendships which alone well repaid the labour. He regretted that health considerations made it necessary for him to retire from the post.

The President said that certain friends desired to present to Mrs. Rogerson a token, which took the form of an enamel hair brush and comb.

Mr. Rogerson briefly acknowledged this second presentation.

The President-Elect, Mr. W. B. McLusky, was then inducted into office.

Mr. Ginman remarked that Mr. McLusky had been a member of the Institution for seventeen years, and the members were well aware how much he merited the distinction now conferred on him. During his term of office the Institution would certainly do useful and progressive work.

THE PRESIDENT,
W. B. McLusky, of Halifax.

Mr. McLusky presided during the rest of the evening.

Mr. Rogerson read a letter from the Secretary of the Institution of Gas Engineers to the effect that the Silver Medal of the Institution will be awarded to the writer of the best paper by a member read before one of the District Associations. The Committees of the District Associations will select papers, send them to the Secretary of the Institution, and they will be considered by a referee appointed by the Executive Committee.

Mr. Shapley remarked that for some years past the Silver Medal of the Institution had not been awarded, and the Council felt that, if an opportunity was given to the District Associations to compete for the Medal, it would add interest to the papers. It was proposed to encourage the Junior Institutions by awarding the Bronze Medal in a similar way.

Mr. J. H. Brearley said he was sorry the Institution had departed from the practice of giving three medals in respect of papers read at the Institution meeting. True, in recent years there had not been many papers; but he thought the wise

policy would have been not to cut out any medal, but to increase the number.

Mr. SHAPLEY replied that it appeared to him to be an extremely happy idea to give a Bronze Medal for the best paper read before the Junior Associations, a Silver Medal for the best paper read before the District Associations, and the Gold Medal for the best paper at the annual conference.

PRESIDENTIAL ADDRESS.

Mr. W. J. SMITH observed that in the ordinary way a presidential address was not discussed, but Mr. McLusky had suggested there should be discussion on this occasion.

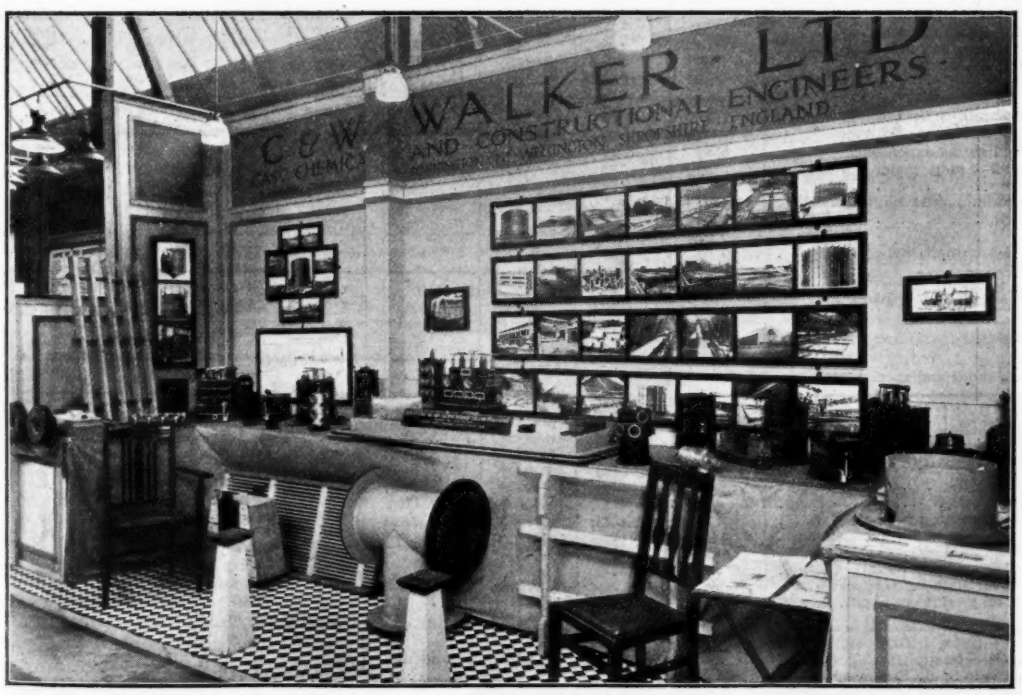
The meeting signified approval.

The PRESIDENT said that he was very pleased they had accepted this proposal. They would have a much better meeting if they gave everyone an opportunity to speak. They had there every Past-President for the last ten years with the exception of Mr. Tagg, who was unavoidably detained. Altogether, they had twelve Past-Presidents, one of whom was their oldest Past-President, Mr. Banbury Ball. (Applause.) Looking back over the history of the Institution, he found they had had some most distinguished men in the Presidential Chair; and he (Mr. McLusky) appreciated the honour of being added to that list.

[At this stage in the proceedings Mr. McLusky delivered his Presidential Address. This, and the discussion which followed, will be published in our issue next week.]

FURTHER VIEWS FROM THE BRITISH INDUSTRIES FAIR, BIRMINGHAM.

TOWN GAS FOR INDUSTRY.



CONSTRUCTIONAL GAS ENGINEERING.

COMPARATIVE WORKING RESULTS OF THE THREE METROPOLITAN AND SIX OF THE SUBURBAN GAS COMPANIES.

STATEMENT SHOWING THE WORKING RESULTS AND THE REVENUE ACCOUNT COSTS PER THERM SOLD FOR THE YEAR 1928.

Compiled by Mr. F. J. Bradfield, the General Manager and Secretary of the Commercial Gas Company.

—	Gas Light and Coke.	S. Metropolitan.	Commercial.	S. Suburban.	Wandsworth.	Tottenham.	Croydon.	Lea Bridge.	Hornsey.
Declared calorific value, B.Th.U.	500	560	500	500	470	500	500	500	500
Gas sold on declared calorific value, therms	234,243,730	89,792,349	19,429,820	18,959,849	17,216,011	16,231,323	13,539,746	4,698,932	4,188,776
Increase, p.ct.	1·09	Dec. ·15*b*	Dec. 2·03	3·24	2·58	1·96	1·80	3·62	1·14
Gas made per ton coal on works tests, therms	72·11*a*	74·68	72·89	72·80	..	73·01	72·00	75·82	70·52
Gas unaccounted-for, p.ct.	4·24	2·26	6·72	8·72	6·84	5·98	6·64.	4·01	2·35
Coke made for sale per ton coal, cwts.	10·39	9·98	11·46	9·20	9·98	10·38	10·12	9·91	11·39
Tar made per ton coal, galls.	10·20	9·70	9·62	10·13	9·39	11·10	9·41	14·88	12·75
Liquor made per ton coal, galls., 8 oz.	36·06	41·60	38·22	35·21	31·25	33·77	39·78	31·24	39·65
Percentage of coke used as fuel	18·38	17·56	15·09	26·15	20·19	20·28	19·53	22·34	12·39
Capital expended per therm sold	s. d. 1 8·77	s. d. 1 5·37*c*	s. d. 1 7·67	s. d. 2 0·24	s. d. 1 9·78	s. d. 1 10·80	s. d. 2 2·34	s. d. 1 9·95	s. d. 1 6·95
Price of gas per therm { L'day, Mid.	d. * d. 8½ 8⅝	d. d. 8⅝ 8⅝	d. d. 9 9	d. † d. 9½ 9½	d. ‡ d. 8 7⅞	d. d. 9 9	d. § d. 9⅝ 9½	d. d. 9 9	d. d. 8 8
Price of gas per therm { Michs, Xmas	8⅝ 8⅝	8⅝ 8¾	9 9	9⅝ 9⅝	7⅞ 7⅞	8⅝ 8⅝	9⅝ 9⅝	8⅞ 8⅞	7½ 7½
Costs per Therm Sold. REVENUE ACCOUNTS.	d.	d.	d.	d.	d.	d.	d.	d.	d.
Coals, oil, &c.	3·30	3·32	3·80	4·47	4·25	4·41	4·52	4·30	4·58
Less residuals—Coke and breeze	1·44	1·46	2·09	1·66	1·81	1·46	1·82	1·12	1·41
Tar	·53	·64	·51	·61	·52	·54	·50	·71	·56
Amm. liq. & sulph. amm.	·09	·15	·25	·05	·06	·06	·11	*Dr.* ·03	·10
Total residuals	2·06	2·25	2·85	2·32	2·39	2·06	2·43	1·80	2·07
Net for coals, oil, &c.	1·24	1·07	·95	2·15	1·86	2·35	2·09	2·50	2·51
MANUFACTURE—									
Salaries	·15	·23	·18	·21	·24	·17	·18	·18	·20
Wages—carbonizing	·42	·64	·49	·61	·51	·60	·54	·54	·47
Purification	·04	·15	·09	·07	·12	·11	·07	·03	·08
Repairs—plant	2·05	2·03	1·96	1·53	1·87	2·08	1·75	1·75	1·09
Net manufacture	3·90	4·12	3·67	4·57	4·60	5·31	4·63	5·00	4·35
DISTRIBUTION—									
Wages and salaries	·55	·34	·33	·45	·46	·29	·54	·12	·26
Repairs—Mains and services, &c.	·80	·62	·54	·97	1·02	1·37	·50	·73	·70
,, Meters & prep. meters & fittings	·44	·73	·89	·70	·68	·52	·33	·42	·41
,, Stoves—ordinary & prepayment	·70	·56	·83	·63	·71	·49	·38	·70	·19
Total net manufacture & distribution	6·39	6·37	6·26	7·32	7·47	7·98	6·38	6·97	5·91
Rents, rates, and taxes	·61	·34	·50	·37	·24	·49	·31	·62	·43
MANAGEMENT—									
Directors, Auditors, and salaries (Secretary, &c.)	·09	·12	·16	·15	·12	·14	·20	·18	·23
Collectors	·19	·24	·29	·20	·22	·19	·26	·14	·06
Stationery and general charges	·14	·22	·18	·14	·21	·16	·22	·18	·15
Co-partnership	·10	·22	·26	·20	·33	·16	·21	·13	·11
Bad debts	·01	·01	·01	·00	·01	·00	·01	·02	·01
Law and parliamentary charges	·00	·01	·01	·04	·01	·00	·01	·00	·00
Superannuation, pension funds, &c.	·17	·10	·26	·28	·20	·18	·29	·08	·17
National Insurance	·06	·25*d*	·06	·06	·08	·07	·04	·05	·05
Sundries	·01	·01	·00	..	·01	..	·00	..	..
Total expenditure (*less* residuals)	7·77	7·89	7·99	8·76	8·90*f*	9·37	7·93	8·37*h*	7·12*i*
GAS (*less* public lighting expenses)	8·27	8·24	8·38	9·24	8·40	8·70	9·37	8·74	7·72
Rentals—Meter & prep. meter & fittings	·83	·72	·77	·65	1·10	·45	·52	·51	·36
Stove	·54	·41	·54	·62	·92	1·75	·53	1·23	·69
Incand. mantle maintenance	..	..	·01	..	·13	..	..	..	..
Miscellaneous	·03	·02	·01	·01	·02	·27*g*	·21	·00	·02
Total—Gas, rentals, &c.	9·67	9·39	9·71	10·52	10·57	11·17	10·63	10·48	8·79
Balance, being profit	1·90	1·50	1·72	1·76	1·67	1·80	2·70	2·11	1·67
Dividend and interest	1·77	1·50	1·82	1·59	1·63	1·58·	2·02	1·34	1·16
Surplus or deficit	·13	Def. ·00	Def. ·10	·17	·04	·22	·68	·77	·51
Contributions to funds and special payments	·09	..	..	..	·16	·20	·53	·26	·30
SUNDRIES.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Coals cost per ton	20 8·13	19 10·93	21 2·51	25 5·00	22 7·71	26 9·87	27 11·50	30 0·61	27 3·00
Coke realized per ton coal	9 11·80	8 8·63	11 9·48	10 2·38	9 0·52	9 10·21	11 7·39	11 0·84	11 10·25
Coke ,, ,, ,, coke	19 2·61	18 0·63	20 6·86	22· 2·16	18 1·54	18 11·85	22 11·39	22 4·17	20 9·77
Breeze ,, per ton	5 1·42	0 5·39	2 6·73	7 5·53	6 8·21	5 5·69	10 0·06	..	..
Tar ,, per gallon	0 4·51	0 4·73	0 3·68	0 4·75	0 3·63	0 3·86	0 3·99	0 4·49	0 3·94
Amm. liquor, &c., realized per butt, 8 oz.	1 11·00	2 4·23	4 0·15	1 0·26	1 2·11	1 4·97	2 1·06	Loss 11·49	2 4·78
Percentage of stoves at rental to consumers	96	114	102	114	91	92	86	72	43
Bad debts p.ct. on total receipts	·10	·07	·05	·03	·09	·03	·11	·14	·09
Net profit p.ct. on ordinary capital	6·24	6·24	5·62	6·34	7·10	8·21*g*	9·76	15·19	9·29
One-fifth penny variation equals gross	£195,203	£93,534*e*	£20,239*e*	£15,800	£14,347	£13,526	£11,283	£3916	£3491
Water gas p.ct. on total make of c.ft.	27·69	..	5·12	..	9·67	25·90	27·59	39·89	41·04

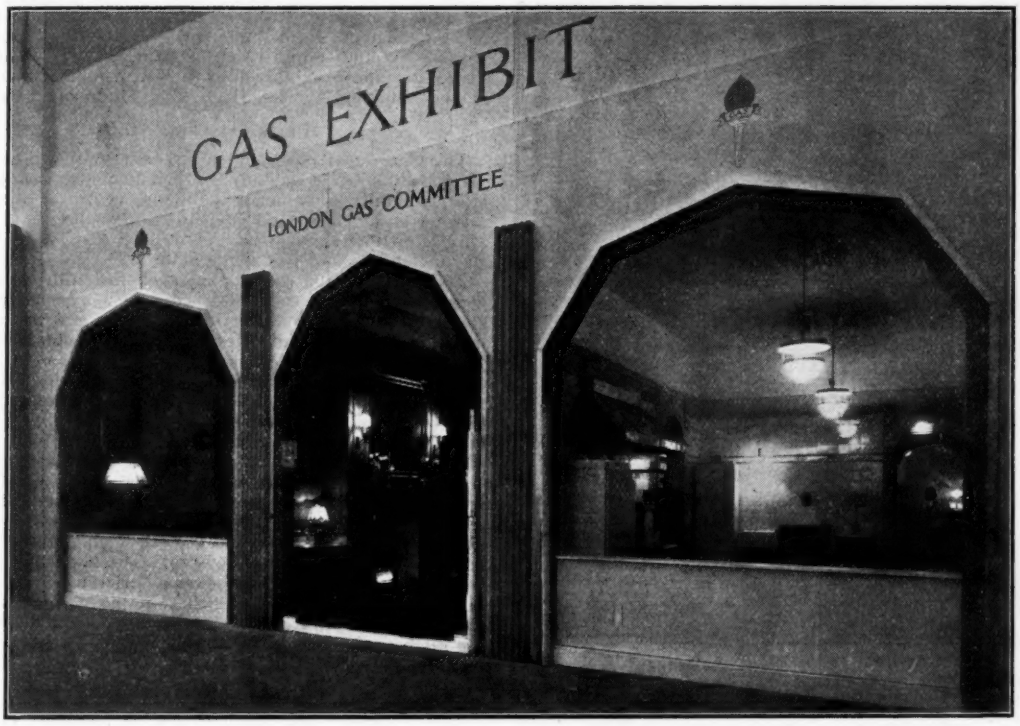
a—Before benzole extraction.
b—Including sales to South Suburban.
c—Ordinary stock of South Suburban eliminated.
d—Including co-partnership insurance fund.
e—One farthing variation.
f—Excluding special purposes fund and capital duty.
g—Including electricity results.
h—Excluding special purposes fund.
i—Exs. *re* issue of stock and contribution to special purposes fund eliminated.

ADDITIONAL PRICES:
*—Brentford, ·8d.
†—Outlying districts: Lady Day and Midsummer, ·8d.; Michaelmas and Christmas, ·5d.
‡—Wimbledon, 1d. Epsom, 2·2d.
§—Caterham, ·4d.

"DAILY MAIL" IDEAL HOME EXHIBITION.

A Coming of Age.

The general and increasing desire for improvement in the atmospheric conditions of London and other large cities lends special significance to the Gas Section of this year's "Daily Mail" Ideal Home Exhibition, which will remain open at Olympia until March 23. The Exhibition affords valuable educational facilities with regard to the great advantage of gas as a heating and lighting agent in the house. The growing popularity of the modern gas fire is evidence that the public is alive to the benefits of this form of heating; and, in addition, every new development affecting the domestic side of the industry is represented in the Exhibition.



The twenty-first year of the existence of the Ideal Home Exhibition is marked at Olympia by a display which embraces a number of special features, and large attendances are being drawn to what is a unique collection of the latest and best among domestic labour saving devices and means of increasing the health and happiness of the people. In such a show gas has, as it should have, a front place; and those connected with the industry who may be able to visit Olympia between now and March 23 (the date of closing of the Exhibition) will be gratified to note how completely gas has been made to harmonize with its surroundings, and how exactly it conforms to the most exacting requirements of the home-lover.

On this occasion, the "Daily Mail" have themselves arranged all the shells of the stands to a uniform design and colour scheme; and taking the Exhibition as a whole, this has resulted in a much improved appearance. So far as the exhibit of the London Gas Companies is concerned, the space allotted to it, which is this year under the gallery, is ample in size, and the building open in character, with plenty of head room available.

THE LONDON GAS EXHIBIT.

As in previous occasions, the London Gas Exhibit is made by the seven principal London and District Gas Companies—namely, the Gas Light and Coke Company, the South Metropolitan Gas Company, the Commercial Gas Company, the South Suburban Gas Company, the Tottenham District Gas Company, the Wandsworth, Wimbledon, and Epsom District Gas Company, and the Croydon Gas Company. The interior of the exhibit has been designed by Mr. Walter Tapper, Pres. R.I.B.A. (and erected by the Gas Light and Coke Company on behalf of the Committee), in the form of nine rooms opening from one to another, and the completed scheme is such as to place gas in its most attractive aspect. The various rooms are allotted to different purposes, so that each one of the eighty or so appliances of the leading makers which are installed appears in an appropriate setting.

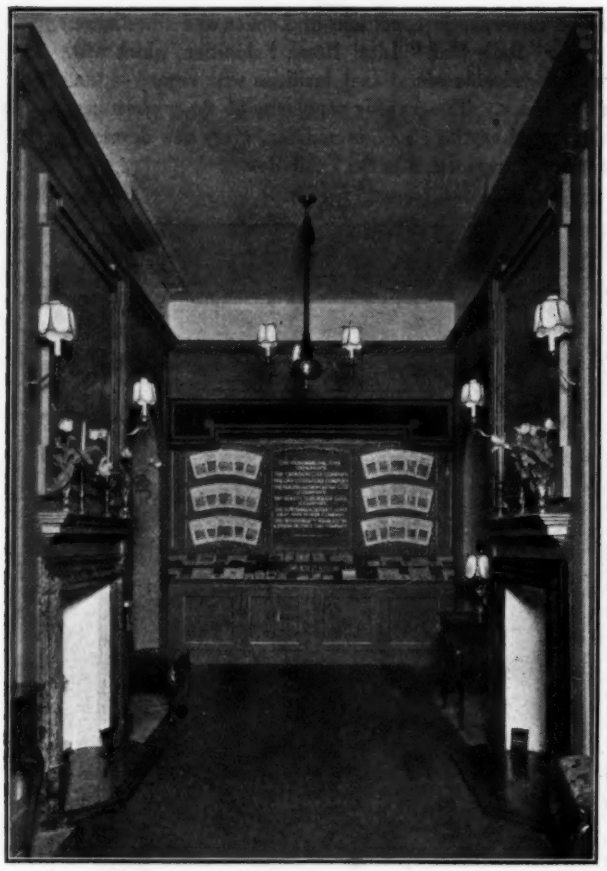
The main entrance to the exhibit takes the form of a lounge, of which the colour scheme is an inviting blue; and at the far end of this lounge is a literature stand containing British Commercial Gas Association and other pamphlets of general interest on the subject of gas. These are laid out in tempting array, so that the visitor may select any of them which may particularly appeal to him. On one side of the lounge is a modern drawing room, in which, handsome as it is, the gas fire and lighting are in no way out of keeping with their surroundings. Gas fires are shown in larger variety in another room, which is entirely devoted to a selection of them in different settings, to suit all kinds of situations.

A feature of the stand is the bathroom, which, in addition to being provided with a porcelain bath and hot water supply, has in it a new aluminium linen cupboard heater, made to the designs of the Gas Light and Coke Company's Research Staff at Watson House. This is provided with a small gas heating unit, and investigation shows it to be a highly efficient heater. This apparatus enables any cupboard to be converted into an airing cupboard at low cost. It is fitted inside the bottom of the cupboard at the back, and connected-up with the gas supply. The cupboard must be ventilated top, bottom, and through the shelves. Warmed air is delivered from the top of the heater from the moment the gas is lighted until it is turned off. Thus the airing cupboard can be perfectly controlled.

In what may be termed the hot water room there is a large display of coke stoves, wash boilers, and large hot water apparatus. After these there is a room for gas irons of all descriptions; and here demonstrations of ironing are given from time to time throughout the day. Appropriately surrounded with oak panelling in a section by itself is a decorative "Metro-Log" fire.

The central room of the exhibit is a large kitchen, fitted up with the latest types of cooker in the attractive mottled enamel finish. Several of these are fitted in recesses, and all are connected to the gas supply. When fitting cookers in tiled recesses, the question of lighting has to be considered; and in this connection there is to be noticed in the exhibit one of those seemingly small ideas which in reality represent a great deal—

a small gas light let into either side of the recess, and having a heat-resisting transparent panel flush with the tiles. The light is thus thrown precisely where it is most wanted—that is, on the hotplate of the cooker. A smaller outer kitchen has in it an eye-level range, also in the new mottled enamel, and an



The Entrance Lounge.

" Electrolux " refrigerator, which is provided with a mirror arranged at such an angle as to show the small size of the gas flame which is required to perform so valuable a service.

No one who passes through this striking exhibit will fail to be attracted by the handsome crystal lighting fittings by Lesofsky, to be seen in the drawing room and the central kitchen. These and many other beautiful lighting fittings forming part of the exhibit are on distant control, and are one of several examples which the Ideal Home Exhibition provides of the ability of gas to meet the most exacting decorative requirements.

HOUSING SECTION.

Great interest, of course, attaches to the Housing Section of the Exhibition; and here the gas industry is to be congratulated upon having obtained two houses in which to demonstrate that gas suitably applied is unrivalled from every point of view for supplying light and all the heat required in a house. A complete gas and coke service for lighting, heating, cooking, water heating, and refrigeration is shown in the Prize Concrete House by the London Gas Exhibit Committee. This house is shown by the Portland Cement Selling and Distributing Company, Ltd., of 20, Buckingham Gate, London, S.W. 1. The " Metro " gas and coke home service is demonstrated by the South Metropolitan Gas Company in the Georgian House exhibited by the A.M.A. Portable and Permanent Building Works, High Road, Laindon, Essex.

Prize Concrete House.

The Concrete House, which has been equipped by the South Metropolitan Gas Company, on behalf of the London Gas Exhibit Committee, is undoubtedly the centre of attraction for architects, builders, and housing authorities; and the Committee are fortunate in having secured this house for demonstrating the uses of gas in the home.

The whole of the rooms have been tastefully arranged; and here, again, a large measure of attention must be drawn to the gas lighting, which has been designed on new and exceptional lines. Most delightful effects have been obtained by using " Metro " burners screened by tinted glass panels. One cannot imagine any lighting system that would impart a warmer or more restful feeling, or that would give a softer light. The fittings in use in the hall, sitting room, and dining room were made by Messrs. Ingram & Kemp, of Birmingham.

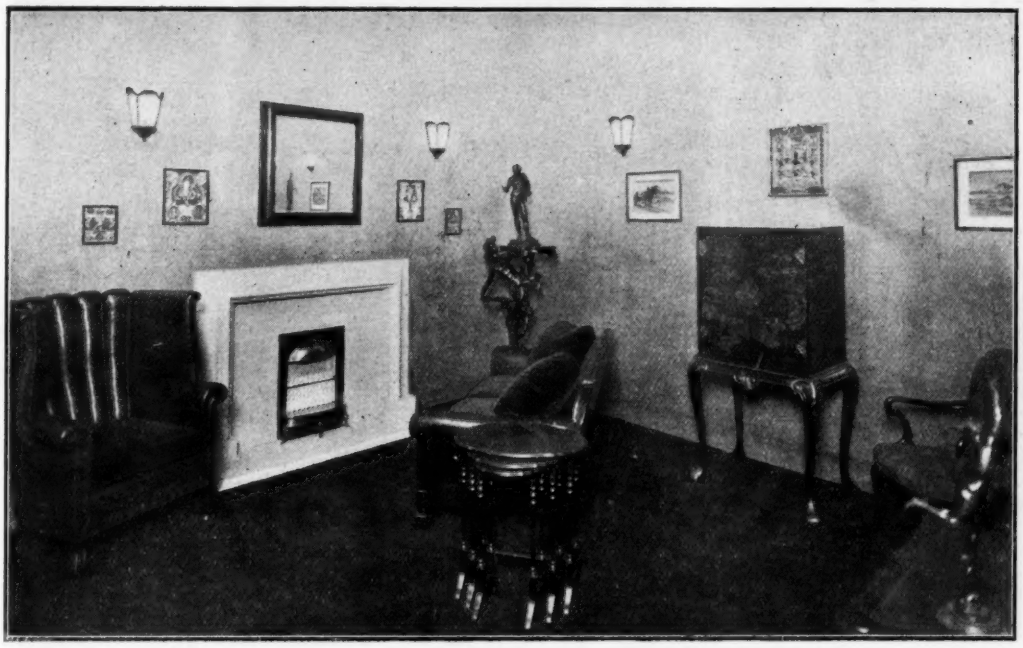
In the sitting room and dining room there are respectively a " Metro " inset coke fire and a " Metro-Log " gas fire, both in armour bright, and in the kitchen is a Fletcher " Kingsway " all-enamelled cooker. The other apparatus includes a Davis safety garage heater, Wilson " York " and Main " Dickens " bedroom fires, and Ewart geysers. The hot water system is a very complete one, and comprises a " Beeston " radiator working from a " Victor " gas boiler in the garage, and another radiator in the hall, a " Domestikatum " coke heated boiler in the kitchen, and a " Victor " builder's set for hot water supply in the scullery.

The Georgian House.

The " Metro " gas lighting, heating, cooking, refrigerating, and water heating equipment of the Georgian House has been designed to show how the task of keeping a house clean can be made as free as possible from hard work and drudgery.

Starting with the lighting, it may be remarked that

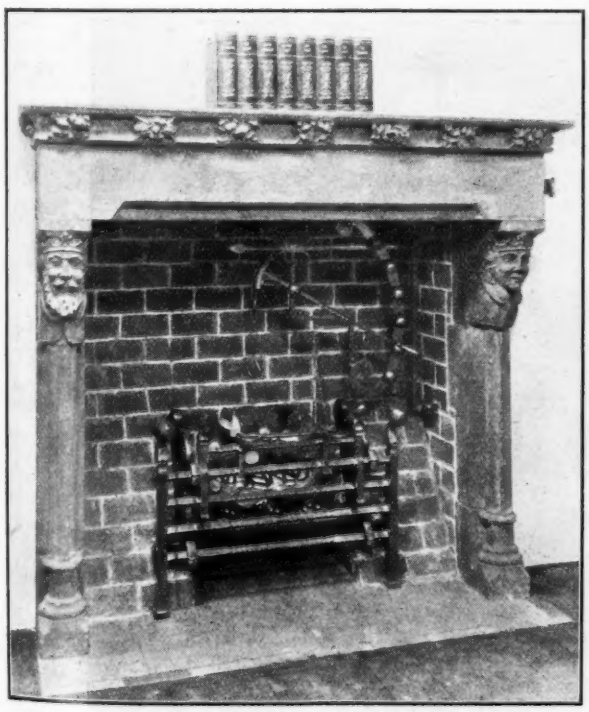
THE CENTRAL KITCHEN OF THE LONDON GAS EXHIBIT.



A STUDY DESIGNED BY SIR WILLIAM ARBUTHNOT LANE.

"Metro" burners, used with artistic, yet inexpensive, "Metro" fittings, shed over the whole house a soft, cheery, comfortable light, which may be switched on and off as desired. In the hall the light is controlled from the foot of the stairs, as well as from the door. The control of the gas-burners from a distant point is made possible by a simple arrangement which can be attached to all fittings, and anyone who desires this additional convenience can have it at a reasonable cost.

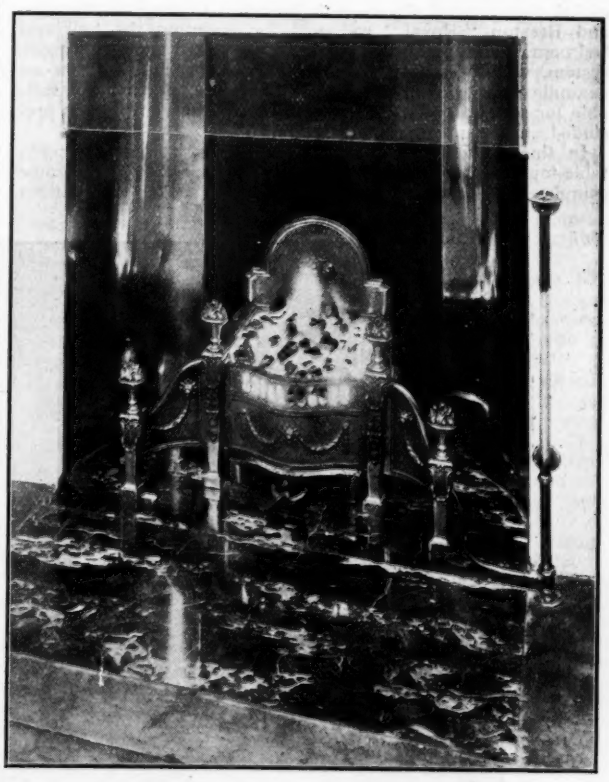
The heating arrangements are ideal. In the sitting room warmth is supplied by the new basket type of "Metro" coke fire, which burns ordinary broken gas coke with a lively flickering flame, but with none of the coal fire's disadvantages. "Metro" coke fires are cheaper to use than coal fires, and are labour saving, for the coke is ignited by means of a gas burner contained in the fire. The specially constructed ashpan



"Metro-Log" Fire in an Old Sussex Grate.

may be used as a shovel, thus enabling the ash to be removed easily. The "Metro" coke fire radiates cheerfulness. It is a healthy fire, and has been installed in hospital wards.

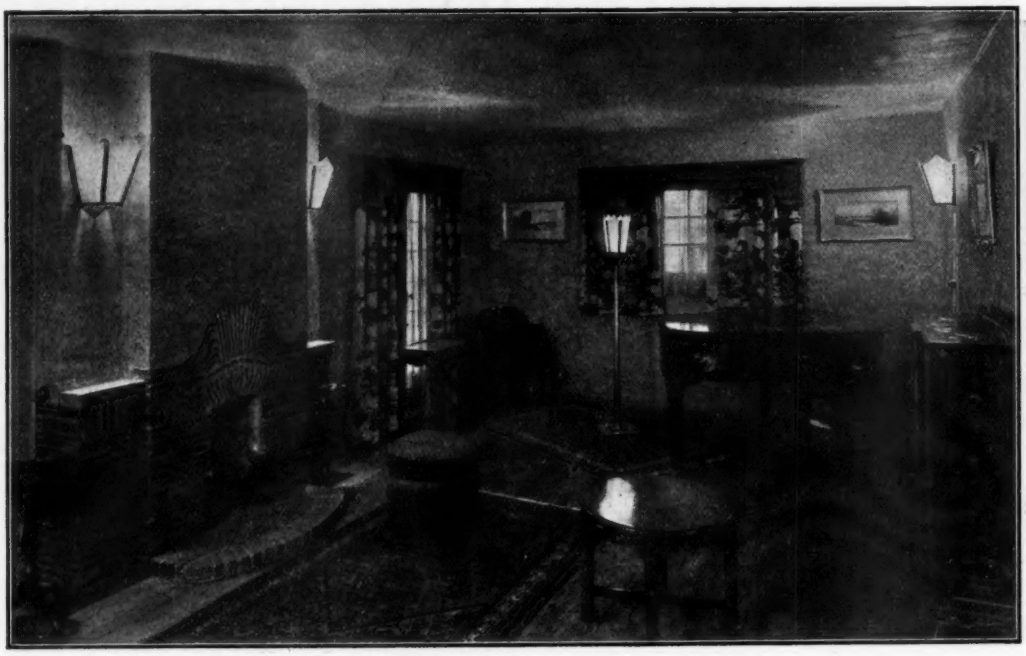
For occasional heating in bedrooms and parlours there have been fixed "Metro" gas fires, which can be provided to match any scheme of decoration; and attention is drawn to the happy combination of gas-fire and fire-place in the bedrooms. This adaptability of the "Metro" service is specially evidenced in



"Metro" Coke Fire, Basket Model; Adam Design.

two details of equipment—the "Metro" smoker's companion and the "Metro" night light. The pilot light attachment of the smoker's companion may also be used with a gas cooker or a gas fire. Here is a light that burns an infinitesimal quantity of gas, and is always handy for lighting the cooker or fire; its trifling cost is repaid a thousand times by the convenience it affords. The night light, which is fixed in a child's bedroom, will burn for 700 hours for a gas consumption of one therm. It gives sufficient light to enable objects to be easily discerned, and will do much to restore the confidence of a child who is afraid of the dark.

The hot water supply is, of course, of first-rate importance;



THE HARMONY OF GAS LIGHT.

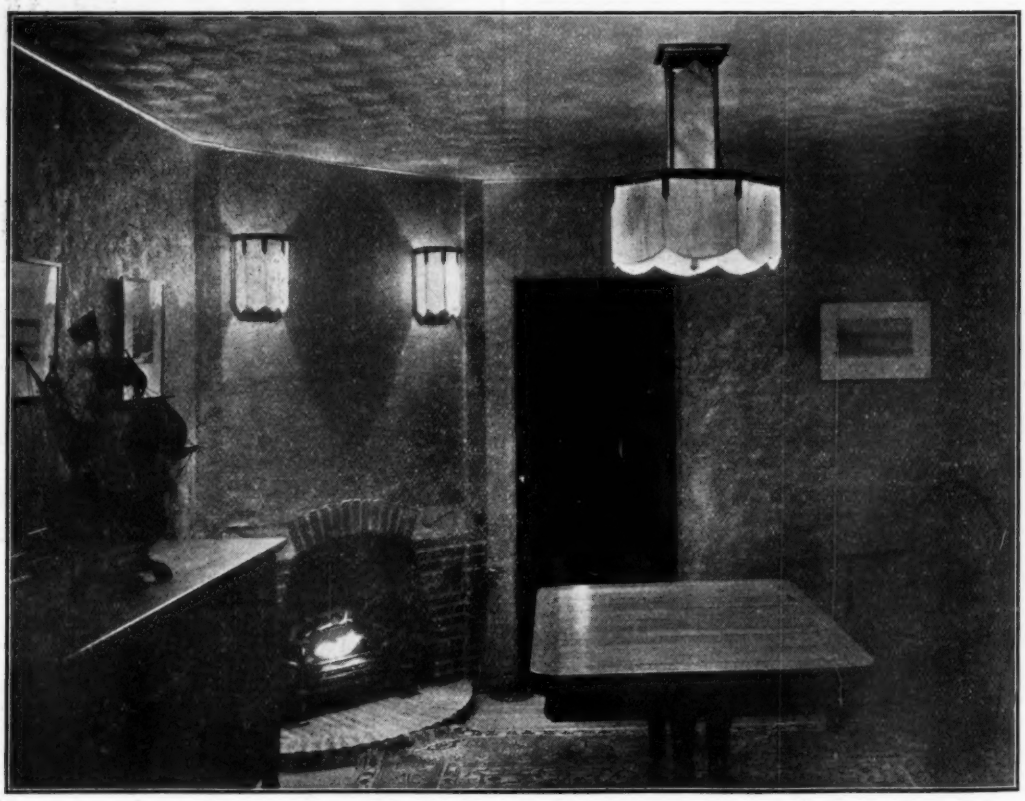
and there is in the bathroom a geyser which will provide hot water at a cost that will not exceed 2d. per bath. Alternative systems of supply are provided by a coke boiler working in conjunction with a "Victor" gas boiler in the kitchen. The circulation operates an airing-coil in the linen cupboard, and a nickel plated towel dryer, with branches to the various taps, and Beeston "Royal" radiators for warming the hall and bedroom. The pipe-work in this case is Lamont's copper system, with "Securex" compression joints; and it forms an example of specialized work of this nature, particularly suitable for soft water districts, where the use of iron pipes is precluded on account of rusting action.

In the kitchen-scullery a "Metro" gas iron, gas copper, table-top "Metro" gas cooker, and gas operated refrigerator complete the equipment. The "Metro" cooker will attract interest, with its conveniently arranged taps and pilot lighter, and its oven temperature regulator.

RADIATION LIMITED,

Thimble Mill Lane, Aston, Birmingham.

The associated gas appliance manufacturers comprised in Radiation Ltd.—Messrs. Arden Hill & Co., Davis Gas Stove Company, Ltd., Fletcher, Russell, & Co., Ltd., Richmonds Gas Stove Company, Ltd., Wilsons & Mathiesons, Ltd.,. and John Wright & Co.—make an extensive display of the latest developments of the well-known "New World" "Regulo-" controlled cooker. The features of this cooker are: (1) Highly-efficient and economical boiling burners; (2) single oven burner with direct bottom flue outlet; (3) an additional low-tempera-



ARTISTIC GAS LIGHTING IN THE CONCRETE HOUSE.

RADIATION LIMITED.

ture cooking zone at the bottom of the oven; (4) automatic control of the gas, enabling the cooking to be done without attention, with no waste of gas, and with certainty of repeated successes; and (5) "Rado" porcelain-enamelled metal work, avoiding rust and dirt. The whole meal—joint, vegetables, and sweets—can be put into the oven at one setting of the "Regulo" dial, and removed together in a given time, without supervision of any kind. Several dozens of such simultaneously-cooked dinner recipes are available in the Radiation Cookery Book.

Radiation gas fires, with the new "Beam" radiant are receiving a large share of attention at the Exhibition. The new radiant heats-up more quickly, radiates a pleasanter warmth with the qualities of sunshine, makes a brighter fire, and at the same time loses none of the heating efficiency and economy of the ordinary gas fire radiant. These new heating radiants will replace the older "Thermo-XX" type in all Radiation gas fires; and examples are to be seen of the wide variety of designs and finishes—stainless metal, oxidized, and colour-finishes, and the new "simulated wood" surface which makes general appeal.

There are geysers for bathroom hot-water supply, and also heavier duty boilers, wash coppers, &c., finished alike in "Rado" porcelain enamel for easy cleaning. "Nautilus" coke boilers are shown in suitable kitchen recesses, side by side with enamelled gas cookers. A special section is devoted to the display of large-scale kitchen apparatus, suitable for the use of hotels, restaurants, boarding houses, canteens, &c., to which all the Radiation makers contribute their latest productions.

Interesting cookery demonstrations are given on the stand; and for these use is made of the latest automatic "New World" cooker.

THOMAS POTTERTON (HEATING ENGINEERS), LTD.

Cavendish Works, Ravenswood Road, Balham, London, S.W. 12.

This firm display their standard form of gas-heated hot water supply apparatus as an example of the latest practice in hot water service for household, trade, and other uses, operated from a No. 921 "Victor" complete set, delivering hot water to the sink and circulating to a nickel plated towel rail for a bathroom. This affords a useful demonstration of the arrangement required for flats, bungalows, or any form of single-storey building where the head of water is extremely limited. The design of the "Victor" complete apparatus, giving a high temperature flow circulation, permits the heating of a towel rail, or even one or two radiators, at the same floor level, to be carried out to the utmost advantage. In fact, this system is adopted in many good-class dwellings. This arrangement is rendered possible by forming the necessary low return without affecting the high temperature delivery of water for washing, &c. A second working example of low pressure hot water heating with radiators upon the "drop system" is shown, with a No. 19 "Victor" boiler "D" Series, likewise working at the same floor level.

In addition to these working examples, the firm are making a general display of "Victor" gas boilers, both "H" and "D" Series of all sizes, and the "Victor" complete apparatus in both rectangular and cylindrical forms—the former being but 12 in. wide, and suitable therefore to stand in narrow spaces. This is one of the prominent advantages of this type of apparatus for flats, and other situations where space is limited. These complete sets are substantial in construction, simple and compact to instal, and easy to maintain; the lime deposit from the waterways being readily removed *in situ*, as access is available entirely from the front of the boiler.

A new feature is to be found in insulated storage with enamelled exterior, for "Victor" complete apparatus No. 921. This is fitted with two forms of burner, one of the bunsen type with "positive control" thermostat, and the second with the standard thermostat operating luminous flames. With the primary and secondary heat losses controlled by effective lagging, the thermostatic arrangement regulates the gas consumption in close proportion to the hot water required for use; and for installations of small size the arrangement will be found extremely advantageous in all respects. For the small villa or private house, an example of combined gas and coke apparatus is shown, with the aid of a "Domestikatum" coke boiler.

On the heating side, one of the large "R" Series "Victor" gas boilers is on view. This is made in three sizes, having capacities of 120,000, 180,000, and 240,000 B.Th.U., and therefore equivalent to operating 600, 900, and 1200 sq. ft. of radiation respectively. Thermostatic control of the most efficient type is available; the rod thermostats being provided with dial adjustment, so that the circulating temperature can be varied to meet the external conditions from day to day. For central heating work the firm are also exhibiting their well-tried arrangement of gas regulation by air temperature control. For larger plants for central heating, sectional boilers, radiators, &c., are displayed.

As an example of modern equipment for residence work there is shown a "Classic" boiler for low pressure hot water heating erected with a "Victor" calorifier or indirect cylinder, to furnish a domestic hot water supply during the winter months. This has as an alternative an "H" Series No. 93 "Victor" boiler for direct action, to supply hot water during the summer. Another item of particular interest is the "Villa" boiler enclosure, applied to a "Domestikatum" coke boiler. This converts the open-fire boiler into a pleasant stove, and entirely obscures the objectionable flue and water pipes. The labour involved in cleaning is reduced to a minimum, as there is no large recess with corners and inaccessible parts to harbour dust. The interior is finished in mottled enamel, red enamel, or other

GAS HEATED HOT WATER APPARATUS.

colour. It is expected that there will be a large demand for this type of stove for small houses, flats, and similar situations.

A "Zepho" water softener is exhibited on the stand. This is made by the Becco Engineering and Chemical Company, Ltd., Fitzalan House, Arundel Street, Strand, W.C. 2.

MISCELLANEOUS EXHIBITS.

Clarkhills, Ltd., of 31, Vauxhall Bridge Road, London, S.W. 1, show their automatic water heaters, which supply unlimited hot water to bath, basins, and sink.

Messrs. Ewart & Son, Ltd., of 346-350, Euston Road, London, N.W. 1, have a big display of their geysers for all purposes, as well as of "Agate" porcelain enamelled baths and lavatory basins.

Messrs. Sidney Flavel & Co., Ltd., of Leamington, show the new "Metro" smokeless open fire, which overcomes the difficulty of burning gas coke in the domestic grate. The fire is lit by a gas burner, which is turned out 20 minutes after lighting, when the coke is satisfactorily ignited. The cost of the fire is about 5d. a day, and existing fireplaces can be converted at an outlay of a few pounds. The fire is made in various styles and finishes, and can be connected-up to a flue pipe or built in any opening. It is also made as a basket grate, and in many forms of dog and hob grates of pleasing appearance The "Metro" coke fire has been awarded the bronze medal of the Royal Sanitary Institute and a certificate by the Institute of Hygiene, and has received the Star of Approval of the Good Housekeeping Institute. There is also shown a gas fire having the appearance of a wood log burning fire. This can be supplied in many designs; and one of the exhibits represents an old Sussex grate with jockey bars and crane, adapted for the "Metro" gas log in appropriate setting.

The Ruud Manufacturing Company, Ltd., of 99, High Holborn, London, W.C. 1, draw attention to the special type of water heater manufactured by them. This apparatus acts automatically, and is claimed to be absolutely safe and sure. It affords a continuous supply of hot water at any spot where it may be required, and can be installed in any convenient position.

INSTITUTION OF CHEMICAL ENGINEERS.

Among the recent elections to membership, &c., of the Institution of Chemical Engineers are the following:

Members.—Messrs. Herbert Baxter Holliday, Engineer and Manager to the Wallasey Gas and Water Department; and Hugh Henry Orr, Chemical Engineer and Manager of the Chemical Department, Belfast Corporation Gas Works.

Associate-Members.—Messrs. Edward Cecil Dixon, Assistant Manager, Templeton Coke and Bye-Product Works, Consett Iron Company, Ltd.; Robert Douglas, A.M.I.Mech.E., Assistant Engineer and Manager, Gas and Water Department, Kendal; and Thomas Lambert, Works Manager, Tar Works and Coke Oven Bye-Products Works, Spennymoor.

Student.—Mr. Ambrose John Cruise, Apprentice with the Cardiff Gas Light and Coke Company.

FORTHCOMING ENGAGEMENTS.

[*Secretaries of Gas and Kindred Organizations are asked to assist in making this diary of events as complete and useful as possible by sending the earliest intimation of all meetings.*]

March 9.—Scottish Junior Gas Association (Eastern District).—Meeting and visit to Messrs. Peebles' Tay Works, Bonnington.

March 9.—Scottish Junior Gas Association (Western District).—Meeting in the Royal Technical College, Glasgow. Paper by Mr. A. Bujnowski on "Ventilation and Gas Fires."

March 12.—Federation of Gas Employers.—Meeting of Central Committee.

March 12.—National Gas Council.—Meeting of the Central Executive Board.

March 14.—Midland Junior Gas Association.—Meeting at Birmingham. Paper by Mr. F. A. Jenkins on "A Short Account of an Education Scheme for Boys and Fitters' Youths;" and a paper by Mr. F. A. C. Pykett on "Reducing Maintenance Costs of Mains and Services."

March 15.—Southern Association of Gas Engineers and Managers.—Meeting at the Hotel Cecil at 2.15 p.m.

March 16.—Wales and Monmouthshire Junior Gas Association.—Meeting at Neath. Paper by Mr. J. W. Thomas.

March 20.—Southern Association of Gas Engineers and Managers (Eastern District).—Meeting.

March 20.—Manchester and District Junior Gas Association.—Joint visit with Yorkshire Junior Gas Association to the New Sharlston Collieries Co., Ltd., Crofton; and to Messrs. Geo. Craddock & Co., Ltd., Wire Rope Works, Wakefield.

March 20.—Yorkshire Junior Gas Association.—See Manchester and District Junior Gas Association above.

March 21.—Southern Association of Gas Engineers and Managers (Eastern District).—Meeting.

March 22.—London and Southern District Junior Gas Association.—Meeting at the Westminster Technical Institute, S.W. 1. Paper by Mr. S. G. Watson.

March 23.—Scottish Junior Gas Association (Western District).—Visit to Dawsholm Gas-Works, Glasgow.

Evening Star Lodge.—In connection with the Annual Meeting of the Institution of Gas Engineers, the Evening Star Lodge, No. 1719, will hold an Emergency Meeting on Thursday, June 6, in the Grand Temple at Freemasons' Hall.

BRITISH ROAD TAR ASSOCIATION'S STANDS.

Exhibits at the British Industries Fair, London and Birmingham.

LONDON.

The recently concluded British Industries Fair has once more demonstrated the value of making known the availability of British materials over a wide range of subjects.

The large number of callers, both from home and abroad, was a satisfactory feature of the interest evinced in the use of British tar for the construction and maintenance of roads. The stands, while entirely different in their design and lay-out, had as the main theme to present in a comprehensive manner the use of tar for roads. This was accomplished at both Sections of the Fair by the display of the various samples, among which were featured some excellent examples of tarmacadam roads, taken up after many years' service on the road.

The striking pictorial display at Birmingham was conspicuous in focussing attention upon the merits of tar, and making known its non-skid properties. In striking contrast, the stand at the White City portrayed the solidarity of tar by creating a symbol which expressed the place it holds in the making of roads.

The Association are to be congratulated on their display, which in the pursuance of their propaganda for the home-produced material for the national highway schemes of the country is so deserving of success.

BIRMINGHAM.

SCOTTISH JUNIOR GAS ASSOCIATION (WESTERN DISTRICT).

Semi-Jubilee Celebration.

The Western District of the Scottish Junior Gas Association celebrated their semi-jubilee by a dinner in the Grand Hotel, Glasgow, on Saturday, Feb. 16. The President (Mr. J. Murray, of Glasgow) occupied the chair. Over one hundred were present, and many of the original members of 1904 renewed acquaintanceship with the Association.

Following the Loyal Toast,

The President said how disappointed the Association were that Mr. Alex. Wilson, their patron and founder, had been unable to join them. He (the speaker) would like to make reference to the announcement of Mr. Terrace that the Institution of Gas Engineers had decided to present a medal for papers read at Junior meetings. This decision was welcomed by the Juniors.

Mr. J. W. McLusky (Engineer and Manager to the Glasgow Corporation Gas Department, and a member of the first Council of the Association) proposed the toast of "The Association." He referred to the Father of the Association, Mr. Alex. Wilson, whose sagacity and foresight had been the means of setting the Association on a firm foundation. He (the speaker) said that since its inception he had always watched with keen interest the progress of the Association; and he had a personal acquaintance with every President. As he looked round, and found so many old Western Juniors in positions of responsibility in the gas industry, he had no fear for the future of the Association.

Mr. Robert Gray (Kingston-on-Thames, a Past-President of the Association), responding to the toast, remarked that he was glad that in the revised Education Scheme of the Institution of Gas Engineers they still had the co-operation of the Westminster Technical Institute and the Board of Education. To have excluded these bodies would have been to risk the failure of the Scheme. As an Association, they could claim to have played a worthy part in education. If one compared the revised Scheme with the memorandum submitted to the Institution by the Association, one could clearly recognize a great similarity. If he had to ask anyone present who had had much experience in the affairs of the gas industry what he considered was the most essential qualification for anyone to possess in order to fit himself for a position of responsibility in the industry, the reply would be "a sound scientific training." It was a young man's duty to the industry to prepare himself for the future; for the responsibilities and the conduct of affairs of the gas industry of to-morrow would be in the hands of the young men of to-day. While they were celebrating the semi-jubilee of the Association, and were able to look back with great pride upon the work accomplished in the past, it must be remembered that much remained to be done. New problems and difficulties would present themselves; but he felt sure that the Association would continue its activities, so that when they met to celebrate the Jubilee, they would be able to say that, while it had doubled its age, the Association had increased its usefulness and activities many times.

Mr. James Dickson (Dundee) proposed "Past-Presidents," to which Mr. John Frazer (Dalmarnock) replied.

"The Corporation of Glasgow" was proposed by Mr. James Bell (Dumbarton) and responded to by Bailie Mill.

The toast of "The Gas Industry" was in the hands of Col. W. Carmichael Peebles (Edinburgh), and Mr. David Fulton (Helensburgh) replied.

"Kindred Associations" was submitted by Mr. R. D. Keillor (Greenock), and the response was made by Mr. W. Dearden (Ex-President of the Scottish Eastern Juniors).

YORKSHIRE JUNIOR GAS ASSOCIATION.

Discussion on Water Heating Problems.

At a Meeting of the Yorkshire Junior Gas Association, on Feb. 16, at the Bradford Gas Department Showrooms, Mr. E. R. B. French (Leeds) delivered a highly interesting paper on "Water Heating Problems." Mr. S. H. Packer (Bradford), the President of the Association, occupied the chair.

On behalf of the Bradford Corporation Gas Committee and Mr. E. J. Sutcliffe (Bradford City Gas Engineer and General Manager)—for whose inability to be present the President apologized—a welcome to the members was voiced by Mr. J. W. Horwill, of Bradford, Junior Vice-President of the Association. Mr. Horwill said the Bradford Gas Committee and Mr. Sutcliffe were always glad to give facilities for meetings for the Yorkshire Junior Association, and to help in any way possible in the work and progress of the members of the industry.

WATER HEATING PROBLEMS.

By E. R. B. French, of the Leeds Gas Department.

I have decided to take as my subject instantaneous heaters, which are known to us all as geysers.

The open type geyser derives its name through the products of combustion being allowed to come into contact with the water, and is still used extensively on account of its cheapness, and especially in some districts where hard water is to be found. With the sealed type geyser the products of combustion are sealed off from contact with the water, and therefore do not contaminate the latter in any way. This pattern fitted with the interlocking taps is the one mostly recommended by the various gas departments and companies. For those districts where a constant supply of water is not ensured, the water supply should be taken from the storage tank, or, better still, a geyser should be installed with an automatic valve. The latter is controlled by the water supply, and the gas can only be fully on while the water is flowing through the geyser. If the water should fail, the gas is immediately cut off with the exception of the pilot light. Many district local bye-laws prohibit a direct connection between a geyser and the water company's main. This can be overcome by using a geyser with a tundish feed.

The Service Geyser.

The service geyser may be described as an independent self-controlled instantaneous water heater, capable of supplying instantly hot water throughout the whole house.

The best method to fix this type of appliance I will describe later. The service geyser is operated entirely by the opening and closing of the hot water taps. The gas remains always at the lowest point until brought into full power by the valve being operated by the opening of a hot tap. When the tap is closed, the gas again returns to the by-pass consumption. The gas, therefore, is only on at full power while the hot water is running, and consequently there is no waste.

The heat is supplied to the water through a copper pipe coil, which presents a very large surface to the heated products of combustion. The cold water enters the coil at the bottom, and by the time it reaches the end of the coil its temperature has been raised to the extent of which I will later describe. The most important part of the service geyser is the automatic valve. Upon this depends the efficiency or otherwise.

The valve looks a formidable object from outside, but when seen in sections and explained, becomes much more simple. The working principle of the valve is to use the pressure exerted by the incoming water to lift the gas valve, and so allow the heat to be transferred to the water. The valve is divided into three distinct portions:

1. The top or water chamber.
2. The middle or weep chamber.
3. The bottom or gas chamber.

A brass spindle runs through the three chambers. At the top this spindle is attached to a rubber diaphragm, and at the opposite end is the gas valve disc, which has upon it a rubber washer pierced to allow a small quantity of gas to pass to the burner to act as a pilot light. This gas valve is kept down to its seating by a bronze spring.

The division between the gas chamber and the central chamber is made as a stuffing box, which allows the spindle to pass through, but will not allow any water to pass. In the division between the central chamber and the water chamber is a cup leather, which allows the spindle to work freely through it, but does not make a perfectly tight joint; and the water which escapes at this point (only a few drops at a time at each operation of the valve) is removed from the valve by the union shown on the left of this chamber.

The action of the valve is as follows. When a hot tap is opened, the pressure on the top side of the diaphragm is released and the water rushes from the inlet into the valve, and, as it has not a direct passage to the water-way through the valve, it exerts its force on the rubber diaphragm and lifts it.

I would like to recommend every gas company or department to test all gas appliances—especially geysers—for themselves. Co-operation between the works chemist and the distribution section is of vital importance to the gas industry. We in Leeds are exceedingly fortunate in having Mr. F. Firth, our Senior Vice-President, and also Mr. Clucas, his assistant, in charge of our Laboratory, and they are untiring in their efforts to assist

us at all times. I am indebted to them for the following tests carried out in our own laboratory.

We took as our basis 20 galls. of hot water for bath purposes, which is the equivalent capacity of the average size circulating cylinder fitted to most cottage property.

BATH WATER TEMPERATURE, 103° FAHR.

Test 1.—Sealed Type Geyser, 2½ Gall. Size (Fitted under Normal Conditions).

[To obtain bath of 20 galls.]

1. Gas used	35·1 c.ft.
2. Gas calorific value	470 B.Th.U.
3. Temp. of cold water inlet	47° Fahr.
4. Average temp. hot water outlet	110° Fahr.
5. Quantity of water delivered	20 galls. (199 lbs.) at 103° Fahr.
6. Temp. of water in bath	103° Fahr.
7. Time of delivery	15 mins. 29 secs.
8. Gas rate per hour	136 c.ft.
9. Water delivered per minute	1·29 galls.
10. Temp. rise	63° Fahr.
11. Efficiency	76 p.ct.
12. Cost of 20 galls. bath (gas at 3s. 9d. per 1000 c.ft., less 5 p.ct., 3s. 6½d. net)	1·50d.

Test 2.—Service Geyser, 3-Gall. Size (Fitted under Normal Conditions).

[To obtain bath of 20 galls.]

1. Gas used	33·6 c.ft.
2. Calorific value, gross	470 B.Th.U.
3. Temp. of cold water inlet	48° Fahr.
4. Average temp. hot water outlet	110° Fahr.
5. Quantity of water delivered	20 galls. (199 lbs.) at 104° Fahr.
6. Temperature of water in bath	104° Fahr.
7. Time of delivery	13 mins. 24 secs.
8. Gas rate per hour	150·5 c.ft.
9. Water delivered per minute	1·49 galls.
10. Temperature rise	62° Fahr.
11. Efficiency	78 p.ct.
12. Cost	1·44d.

Test 3.—Service Geyser.

[To supply hot water for dish washing.]

1. Gas used	10·23 c.ft.
2. Calorific value	470 B.Th.U.
3. Temp. cold water inlet	48° Fahr.
4. Average temp. hot water outlet	142° Fahr.
5. Quantity of hot water delivered	4 galls. (39·4 lbs.) 142° Fahr.
6. Time of delivery	4 mins. 16 secs.
7. Gas rate per hour	144 c.ft.
8. Water delivered per minute	0·937 gall.
9. Temperature rise	94° Fahr.
10. Efficiency	77 p.ct.

Great care should be exercised in recommending instantaneous water heaters, to ensure that the correct appliance is fixed to give the results expected of it.

It is essential to inspect first the room where the appliance is to be fixed. After ascertaining the consumer's requirements as to the amount of hot water to be used, and taking into consideration the size of bath, this will give some idea as to the type and capacity of the geyser to recommend. If it is a large bath, nothing less than a 3¼-gallon output per minute should be fixed.

Ensure that there is an ample gas supply direct from the meter and a satisfactory water supply. Fix a stop cock to each supply, and if it is an old house see that the water service is not teed off to two or three houses. The next thing is the flue outlet. This should not be decreased in size under any consideration. There should be a straight rise from the geyser to baffle or baffler of approved pattern through copper and asbestos ceiling plate and termination under the underdrawing if possible. Care must be taken that the products of combustion find an exit into the open air. If this is not possible, the flue should be taken through the outside wall and terminated above the eaves; while care must be taken in the selection of the terminal to obviate down draught. At least a ½-in. full way outlet in compo or copper should be run from the union to the waste above the trap.

Ventilation.

A very rigid test should be made under various conditions for down draught, and under no consideration should a geyser be fixed and left if such is discovered, as it is most dangerous. Mr. James W. Wood, M.Sc., has carried out some exceedingly interesting tests, and I would refer you to his findings as reported to the Institution of Gas Engineers in 1928.

A valuable suggestion made by Mr. Wood in course of conversation was the possibility of increasing the ventilating facilities of the bathroom by fitting louvre vents in the doors, similar to those fitted in ships' cabin doors. One must not overlook the fact that a 4 or 4½ in. baffle, properly functioning, will afford splendid ventilating facilities even to a small room.

The Fixing of the Service Geyser.

It is possible to connect a service geyser to a circulating system by incorporating check valves, or by cutting out a portion of the circulating system and utilizing what is required. I, personally, do not recommend this. A separate installation in lead or copper is much more satisfactory, especially when one may be using badly worn or partially corroded pipes, or connecting on to pipes much too light in weight, which would result in burst pipes. The position usually selected for the service geyser is the scullery or kitchen, with the water and gas connected direct to the mains as previously. Connect the hot water in the shortest possible runs to the points desired (baffles and terminals as before), special care being given to stop cocks for water and gas, and at least ⅝ in. or ¾ in. for condensation outlet.

Service after fixing is a point to which we in Leeds have given careful thought, and we have several fitters who are kept on this work entirely. The nature and solution of the complaints received by these fitters are most interesting. It is easy to tell at once the appliances fixed by the Department and those fixed by people outside the gas industry. One case I well recall of a geyser purchased at a gas showroom by a gentleman, and being returned as no good. The installation was inspected, and I found a 96 ft. run of ½-in. compo feeding six lighting points, one cooker point, and geyser. The condensation outlet ran straight into the bath, and there was no stop cock and no baffle. The plumber was annoyed when his work was condemned, and put the fault on the geyser. He was quickly convinced when the appliance was fixed in front of him to a check meter, and the output and temperature of the water measured to the entire satisfaction of the purchaser.

Complaints.

Service Geyser.

Complaint Received from Consumer.	What was Found.	Procedure Taken.
1. Geyser leaking	Condensation choked and tray overflowing.	Condensation pipe cleaned and washed out.
2. Geyser smelling	Defective flue and too much gas.	Flue cowl altered and gas reduced at stop cock.

Ordinary Geyser.

Complaint Received from Consumer.	What was Found.	Procedure Taken.
1. No hot water	Inadequate gas supply and no water stop cock. Passing too much water.	Larger gas supply run and water stop cock fixed.
2. Geyser out of order.	Geyser installed by private plumber. ½ in. lead from meter, ⅝ in. connection into same. 80 ft. run. No baffle. Condensation run into bath.	Refixed entirely.
3. Geyser leaking	Appliance burnt out. No interlocking taps. This sometimes happens through interlocking taps being out of alignment.	New geyser fixed on hire purchase.
4. Geyser blowing out. Down draught	No baffle fixed and flue pipe run into open ventilating brick.	Baffle fixed. Flue pipe extended.

There are, of course, many other complaints which mean only minor adjustments. The ideal would be to have an outer shield of the service geyser of a material which is resistant to the deleterious action of the condensates from the products of combustion. Failing this it would be advisable to use a metal which, if acted upon by condensates, would form salts easily soluble in water, and therefore be carried away by the ordinary process of condensation and drainage.

Realizing the difficulty of obtaining the ideal, in view of the expense incurred, we decided to compromise by shoeing the galvanized shield with 5 in. of copper. The solution to this problem is still in an experimental stage.

In this month's issue of the Journal of the Royal Sanitary Institute I noticed a report regarding the fixing of geysers at Bristol, where bye-laws have been instituted to prevent any geyser being fixed without an adequate flue pipe, carried off in an efficient manner, and finished with a proper flue terminal. This I feel is a step in the right direction, which might be followed by many corporate bodies.

Discussion.

The President, opening the discussion, said the meeting had listened to a very practical paper and one which was timely, because the question of gas consumption by way of water heaters was most important, and was rapidly extending. Personally, he felt the industry had hardly made the same progress in that particular field of business as they had in regard to cookers and fires; and anything

that could contribute to further development of water heating by gas must be of real benefit to the industry as well as to the consumer. Any gas undertaking that wished to keep up with the times must realize there was business to be developed in this direction. Much depended, he thought, on encouraging local plumbers to take an interest in these appliances. At Bradford they had a room specially set apart at the central showrooms, to which they could take any plumber and show him the gas geysers installed as they should be fitted. Plumbers were encouraged to seek advice on the installation of geysers, and it had been proved that the advice was recognized as very valuable. There were a good many master plumbers in Bradford who, when they found themselves in any little difficulty in regard to the circumstances in which a gas geyser had to be installed, would telephone to the gas showrooms; and a man would be sent from there to assist. There was a happy co-operation between the Gas Department and the plumbers which was most valuable to both parties, and ensured the consumer getting an appliance fitted to give the best results. A point which had not been mentioned in Mr. French's paper was that of the unsatisfactory situation created by the tendency of some plumbers to fix gas geysers to work on a meter which was too small for the job. The results of fixing a geyser to a 5-light meter which had to serve the other household purposes must be obvious. Generally speaking, he thought that in West Yorkshire it was found that gas-heated circulators were more generally used than the geyser. Mr. French had necessarily had to confine himself to one aspect of the water-heating question; otherwise he might have touched on circulators as well as geysers. In West Yorkshire practically all the houses had the usual fire-back boiler and chimney-breast, and often the circulator was an easier appliance to instal. It was easier to fix, and perhaps for that reason easier to sell. Mr. Packer said he would like to ask whether at Leeds they hired out geysers, and, if so, what the terms were. If not, it would be interesting to know Mr. French's own opinion as to what results might be expected from such hiring.

Mr. French said that in Leeds they certainly had a large number of circulators, but on many new housing estates they had been fortunate in installing service geysers which displaced the household boiler entirely. He did not think the hire of service geysers was undertaken by many gas undertakings in the country. The big drawback to hire was the cost of installation. The average cost of proper installation worked out at something like £4 to £4 10s., and that was rather a big item to ask the consumer to pay as a first outlay; while if it was to be included in the rental charge, there was always the danger of the appliance being ordered back and the installation cost being left as a charge to the department. In Leeds they put out the ordinary geyser on hire-purchase. The consumer simply paid the first instalment and no big initial deposit. There was, however, a clause in the hire-purchase agreement to the effect that on any appliance disconnected the consumer had to pay up to the first twelve months, which covered a good portion of the fixing charge.

Mr. H. Wilde (Bradford; Hon. Treasurer of the Association) thought they would all be agreed that a stop should be put to the makers' description of these appliances as giving 2½ galls. of hot water per minute. Anybody who sold them knew that, though they were rated by the makers to give 2½ galls. per minute—meaning 8 minutes for a 20-gall. bath—in practice it took about double that time. Some steps should surely be taken to persuade the makers to revise figures which were so misleading, and to give a plain statement so that the inquirer knew exactly what he was going to obtain. Nobody would get a bath in the 8 minutes, which the catalogues led one to believe. Mr. Wilde remarked that in the Clarkhill type of geyser there was a filter placed in the cold water feed which would stop any impurity which might be in the water and prevent it from reaching the valve. He thought it would be good if that were incorporated in all types. In regard to the by-pass consumption on these geysers, this was rather heavy; and where the geyser was not in use most of the day, it might be of advantage if it could be cut down.

Mr. French, replying, said, in regard to the by-pass consumption, that in the "Califont" type it was about 4 c.ft. per hour, but that it could be reduced by fitting a separate by-pass, as on the Clarkhill, where one got a consumption of about 1½ c.ft. per hour. In extremely cold weather, such as that recently, there was an advantage in leaving the by-pass on and preventing the coils from freezing up. In regard to the filter, he thought Mr. Wilde had been misled. The deposit seen in the condensation tray was not due to any material impurities in the water, but was entirely due to condensation. That was why he (Mr. French) stressed the importance of an adequate condensation outlet.

Mr. J. W. Carlton (Shipley) asked what kind of flue terminal Mr. French would recommend. Would he suggest, where possible, taking the flue pipe into the false roof rather than outside? Had the author any trouble in getting sufficient gas through to the burner due to not having sufficient water pressure? On the question of the by-pass and burners, Mr. Carlton said he personally favoured a separate flashing by-pass to avoid any likelihood of the by-pass blowing out.

Mr. French said he thought it would be agreed that the man was yet to be found who had designed a perfect flue terminal. He could not say that he had yet found a terminal to cover every job. In his own experience he had had jobs on which every type of terminal had been tried. Personally, he would never recommend the installation of a geyser in an underground kitchen.

Mr. Carlton asked what was the most satisfactory cowl.

Mr. French replied that in most cases the ordinary torpedo was found to be as satisfactory as any, but the mushroom cowl was also good. In further answer to Mr. Carlton, Mr. French said he would prefer to terminate the flue pipe in the false roof rather than outside. One must, of course, put on a proper terminal in the same way as outside, to prevent any of the heat from getting to the rafters. In regard to water pressure so far as concerned the valves in a particular type of appliance, he believed the minimum recommended was about 6 lbs., but by a suitable valve one could get down to as low as 2 lbs. pressure; and if Mr. Carlton was having difficulty, this was to be recommended.

Mr. J. W. Wood, M.Sc. (Leeds University), said that in a certain publication one found that a specification for geysers was that they should have a minimum thermal efficiency of 80 p.ct. An efficiency of from 75 to 80 p.ct. was a very reasonable efficiency for a gas appliance, and there was some risk in aiming at anything higher than that. The safe operation of the geyser was dependent on satisfactory ventilation. With 80 p.ct. of the heat transmitted to the water, and some 10 p.ct. locked up as latent heat in the products, only 10 p.ct. of the heat of the gas was available for heating the flue and maintaining efficient ventilation. The risk of imperfect combustion was considerable if that small margin was encroached upon. The question of condensation was next raised. Assuming that 1 c.ft. of gas was required for heating 1 gall. of water, and that 1 c.ft. of gas would produce about 1 c.ft. of water vapour, if the whole of the water vapour produced by the combustion of the gas were condensed (heating a 20-gall. bath), one would have to deal with something like a pint of water in the form of condensate. In practice one only got about 10 p.ct. of this amount. Measurements showed that the flue outlet temperature was about 570° Fahr. Condensation did not occur immediately when the temperature within the geyser fell to 212° Fahr. There was no condensation until one got down to the dew-point. With ordinary calorific value gas (470-500 B.Th.U.) the dew-point of the theoretical products of combustion was about 140° Fahr. If the geyser was burning with a normal excess of air, the amount of carbon dioxide would be about 9 to 10 p.ct., and the dew-point about 127° Fahr. The condensate on the tray was about 10 p.ct. of the water formed, so that the dew-point of the out-going flue gases normally would be round about 120° Fahr. It might be possible, by running warm water through the geyser, to keep the temperature up so that there would be little condensation in the geyser itself, but as soon as the temperature fell below 120° Fahr., one would get condensation, with corrosion of iron flue pipes, or rotting of the usual composition pipes. Mr. Wood said he thought the only thing materially wrong with the makers' specifications was the output, and, generally speaking, no absurd efficiencies were claimed. The trouble was that normally the actual temperature of the inlet water was below that specified by the makers. Further, water at 100° Fahr. was not a hot bath, and an additional 5° to 8° must be allowed for cooling while running into the bath. Mr. Wood said it would be interesting to know, in the automatic valves shown, if there were any means of adjusting the quantity of gas in relation to the water flow. Otherwise, when the water was rather cold, one was compelled to be content with a lukewarm outlet. Mr. French had recommended a stop-cock. Should that be some distance from the geyser and preferably sealed? If the cock was too easily accessible, Mr. Wood thought, the gas might be turned on when the water was shut off, and thus largely do away with the advantages of interlocking gas and water taps.

Mr. French, replying, said Mr. Wood had for some time been carrying out careful tests of geysers for the Institution of Gas Engineers, and his publication on that matter was very well worth reading. In regard to stop-cocks, he (Mr. French) was greatly in favour of water stop-cocks. If one had a big pressure from the main direct on to the geyser, the smallest amount the lever cock might be opened would pass considerably more than the 2½ galls. per minute, and unless there was some means of curtailing that, there would be no possibility of heating the water to the temperature required. The other point made by Mr. Wood was important with this type of geyser. When the water was shut down to a very great extent to obtain hotter water, one closed the valve. That could be overcome by the adjustment in the appliance itself. In some cases it was found that the gas valve was not closing quickly enough. In Leeds they fitted a water stop-cock in every case. It was not sealed. The Department endeavoured to educate the consumers to open up the water cock a little more in summer, and in the winter months to close it a little. That did not apply so much to geysers without interlocking cocks, but in the case of those with such cocks he thought it was essential.

Mr. C. H. Chester (Wakefield) asked if Mr. French had any difficulty in such a matter as fitting a geyser or any hot water appliance in a somewhat complicated kitchen with a gas fire instead of a coal fire, but with the flue from the geyser running into the ordinary kitchen chimney. In his (Mr. Chester's) experience the moisture deposit gave trouble in one or two cases, and in the particular case he had in mind it was not feasible to take the flue outside. How, in a case of that kind, would Mr. French get over the difficulty of damping the walls? The products of combustion from the chimney breast were not sufficiently hot to prevent the moisture coming through the paper into the room. It was an all-gas house. Mr. French had, as a matter of fact, given his view as to fitting geysers in cellars and did not recommend it. He (Mr. Chester) had had occasion to fit a geyser in the laboratory at their own works recently. They tried every method of fixing the flue to that geyser, but could not get it to work properly. The amount of gas consumed in the laboratory was taking so much air that when the appliance was lit there was not sufficient inlet of air into the room to keep the geyser going. They put in a balance flue on the same principle as the new Davis ventilated radiator, and they found that was the only type of flue which would work.

Mr. French agreed that the balance flue was a good way of overcoming such a difficulty. In that particular case of the laboratory, he thought, the obvious way was to seal the air inlet and air outlet from the geyser, to keep it entirely separate. Regarding the other difficulty of the all-gas house, in most cases of that kind perhaps it was better to instal a coke boiler. He thought probably the only way to overcome the difficulty described by Mr. Chester was by putting louvre vent bricks in the upper portion of the chimney-breast.

Mr. Chester said that in this case they were fitted; and they had to put a coke fire in to overcome the difficulty. It was a very high stack and not troubled by down-draught.

Mr. French remarked that they all came up against cases which

were very difficult to solve, and the case mentioned was of the type one would wish to see before giving a definite opinion.

Mr. T. E. PARRY (St. Helens) said that it seemed to him that Mr. Wood's remarks on the effect of the dew-point on condensation would apply to some extent to a static condition of gas, but he (Mr. Parry) thought where there was a flow of gas there would be some tendency for a local condensation at the dew-point in the immediate locality of the tube. Local cooling would affect the dew-point in the neighbourhood of the tubes and would rule out the purely theoretical consideration such as Mr. Wood gave. Furthermore, there might be the presence of a certain amount of sulphuric acid, &c., which would affect the temperature of condensation and would eliminate the possibility of considering it from the aspect of pure water.

Mr. WOOD said he hardly thought his treatment of the subject was entirely theoretical. He had pointed out that the gas from an ordinary geyser left at a temperature of 570° Fahr., which was considerably in excess of the highest dew-point for ordinary gas. Yet the fact that they did get some condensate meant that locally—and especially in the lower part of the geyser—the gases in the neighbourhood of the walls or coils were brought down well below the dew-point. That cooled gas mixed with the remaining gas, and in his observations he had made allowance for that. Where one had a gas stream of any considerable diameter one was liable to have local condensation at the walls. He hardly thought the concentration of dissolved sulphuric acid or copper sulphate was sufficient to affect the vapour pressure or dew-point to any noticeable extent.

Mr. C. H. CHESTER (Wakefield) proposed, and Mr. R. BAKER (Sheffield) seconded, a hearty vote of thanks to Mr. French for his paper.

On the motion of Mr. R. N. WEBB (Leeds), seconded by Mr. J. W. CARLTON (Shipley), the meeting expressed thanks to the Bradford Gas Committee and Mr. E. J. Sutcliffe for the facilities afforded for the meeting, and thanks were added also to the members of the staff at Bradford who had been responsible for the preparations for the meeting.

WORKS INSPECTION.

By H. C SIMS, Assoc.M.Inst.C.E., of the South Metropolitan Gas Company.

[London and Southern District Junior Gas Association, Feb. 22.]

The South Metropolitan Gas Company, with whom I have the honour to be associated, demand a very high standard of efficiency from all manufacturing plant. This is necessary in order to maintain the standard quality of the gas supply in respect of calorific value, inerts, and low sulphur content.

To assist the technical officers of the Company to keep the manufacturing plant up to the required state of efficiency, a regular and systematic examination has been in vogue for some years; and this has amply justified its existence because of the resultant steady improvement in process efficiency. An examination of the annual figures for gaseous thermal yield per ton of coal carbonized and per retort—and this coal gas only, without the admixture of water gas—shows that the yield must be considered very satisfactory.

The object of any system of works inspection must be the discovery, and then the elimination, of all defects, perhaps small in themselves, but large in the aggregate, which reduce the efficiency so much, and thus increase the running costs of any plant. If, therefore, a regular system of inspection is carried out, much depreciation of plant may be avoided, and a larger output obtained per unit of plant, with consequent financial benefit to the Company.

When the war came to an end, the demand for gas was increasing. The cost of material and labour for renewals and extensions was very high, and in order to meet the increased demands made upon plant that had not been increased in capacity since 1914, because regular renewals and repairs were out of the question, the management had a problem which caused them considerable concern. Steps had to be taken, therefore, to get the best possible results out of existing plant, and to eliminate losses as far as possible while renewals were being overtaken. A system of retort house inspection came into being, at first of a very tentative character, but which gradually became more established and thorough by including plant outside the retort house; and this system has now become part of the organization of the South Metropolitan Gas Company. These inspections have revealed many faults and have suggested many remedies, the application of which has resulted in a steady increase of plant efficiency.

A start was made by visiting all retort houses in turn, and inspecting the condition of the retort bench fittings, as regards their freedom from gas leaks and the soundness of the retorts; and to take note of the loss of gas up the waste gas shafts when the retorts were subjected to pressure. In order to test for tightness of retort bench fittings, the retort benches were put under pressure; all leaks up to the inlet of the retort house governors being counted and recorded. The soundness of the retorts was estimated by the volume of discharge up the shafts; this being recorded as light, medium, or heavy. This soon led to the location of the sources of the loss of gas. The putting of the retort benches under pressure detected weaknesses in the maintenance of the fittings. As a result, reduction of the inert content of the gas has taken place, together with an improvement in its quality; and at the same time a marked decrease in gas losses has been effected.

A schedule for regular inspection was then drawn up to embody the foregoing tests, and was subsequently extended to include other features of retort house working—*e.g.*, whether charges were too heavy or too light, how they were laid in the retort, whether the ends of the charges were too far on the mouthpieces, so that these ends were not carbonized, and whether the charges were too far back, leaving part of the retort with no work to do. The feeding covers and clinkering doors of the producers were to be examined for tightness; hydraulic fittings were to be examined for leakage, to reduce the loss of high-pressure water; and the watering-down pipes in the coke holes for loss of low-pressure water. The number of charges which could not be pushed out properly by the chargers, and thus required pricking, had also to be reported. For all these points a maximum number of marks was to be given.

Two complete inspections of the Company's retort houses proved that this system had its weaknesses. The difficulty of appraising the condition of the retort house proved very difficult; and no matter how impartial the inspector was, an element of bias seemed to creep in. So the whole matter was again reviewed, and a system of testing was devised which left nothing to the judgment of the inspectors, but which simply gave hard and fast facts. This is the basis of the system at present in force. Modifications have necessarily been made from time to time. The duties of the inspection staff include the examination of hydraulic stoking machines for speed of charging, quickness of travel, water consumption, and whether the charge is being properly laid in the retort, or, in the case of the pusher, the spent charge is being properly discharged. Other accessories to retort house working, such as watering-down pipes, are also inspected. The tests applicable to stoking machinery must of necessity vary according to the type of machine used.

HYDRAULIC STOKING MACHINES.

The standard charging machine of the South Metropolitan Gas Company is of the Arrol Foulis type. In this the coal is put into the retort in seven or more falls, and the machines work in pairs. Under the hopper containing the coal is a revolving drum actuated by a small vertical hydraulic engine which is timed to work in conjunction with the ram carrying the spearhead which drives the coal into the retorts. The drum, as used until recently, was divided into nine compartments, and the drum revolved always in one direction; this movement being given by a ratchet driven off the coal drum engine. A brake strap prevents the drum revolving too far each stroke. When the drum revolves, the coal from one or more of these compartments drops into a chute pan entering the mouthpiece, and the spearhead pushes into the retort seven falls or more, according to the circumstances. This constitutes the charge. Every stroke of the spearhead is automatically shortened by means of a stopper bar; the last stroke pushing the last fall just clear of the mouthpiece. It is essential to prevent loss of gas while charging, and therefore the time factor is of great importance. But it does not necessarily follow that the highest speed is the best. In order to lay a good charge, the retort must be well filled without being packed in the centre.

It is essential, when the charging machines are working in pairs, that the speed of charging of each machine should be as nearly as possible the same, for if one machine be faster than the other, then it will be found that in the end of the retort farthest from the faster machine the charge is heavy, and very light on the near end of the retort, resulting in uneven carbonization. This is particularly applicable to the Arrol Foulis charges. The speed of charging is therefore of great importance. A necessary duty of those inspecting the machines is to see that the speed is kept within the limits laid down. Incidentally it is remarkable how all the machines in the Company conform to these limiting speeds. If the speed of charging exceeds the upper limit, here again the tendency is to pack the coal in the middle of the retort, and there is incomplete carbonization at that point. It has now become a matter of routine at one station of the Company to take daily timings of the charging speeds of their machines.

In the Arrol Foulis type of machine it is absolutely necessary that the stops automatically shortening the stroke of the spear-

head shall work correctly. If one or more stops fail to come into action, the ram continues to move till the coal already in the retorts brings it to rest. This means a packed charge, which is undesirable. These stops must therefore be inspected from time to time to see if any are failing to act. The speed of travel will be an indication of the condition of the traversing motor. There is a speed in either direction between certain limits which is the best possible for the prevailing conditions of work in the particular retort house under inspection. Periodical tests of the speed of travel show whether the machines are conforming to the limits laid down, or whether they are too slow in travelling from retort to retort or to the overhead hopper for coal, or too fast, and so causing unnecessary wear and tear on the machine by stalling.

Discharging Speeds and Water Consumption.

The time of discharging the coke from the retort by the pusher is also noted, to ensure that slowness of discharging is not sufficiently marked to hold up the charger.

The consumption of high-pressure water by the stoking machinery is also investigated during an inspection. The losses from this source through leakage past valves, leathers, &c., can be very high unless careful watch is kept. A systematic inspection of the machine, and hence a test on the water consumption, draws attention to neglect in the upkeep of the machines. The water used by the motor in traversing is also ascertained and recorded; and as time has gone on, these tests have led to a considerable reduction in the quantity of water used.

Coal Falls and Charges.

Several measurements and weighings of the falls of coal from the drums of the machines revealed the fact that the falls were very irregular, both in volume and weight, giving a variable charge in longitudinal length of the retort, heavy in some places and light in others. It was found that the throw of the type of drum then in use was very irregular. Ultimately, however, a new type of drum was evolved which quickly overcame most of these irregularities. As the revolving drum is not a weighing machine, or even a measuring device, it is obvious that the size of the coal passing through the drum is an important factor. This leads us back to the coal crusher. No matter how well designed the coal drum is, it will fail if the crusher is not doing its duty. It has been found that, if the coal is very fine, the drum will throw over the capacity for which it is set, and, if large, under that capacity. It is one of the duties of the inspection staff to take every machine in turn, and to investigate the variation in weight and volume of coal thrown by the drum, and also the variation in weight and volume of the charge. A certain quantity of the coal being used is also investigated as to its conformity to a given size; and this gives an indication as to the condition of the crusher. Thus a check is kept on the working of this most essential part of the machine; and the results obtained from these tests have led to an improvement in working the coal drum.

A loss of coal by spillage from the charging machine can take place through many causes—for example, by the driver overfilling his machine hopper from the main hopper; from the elevators filling the hoppers; through overflow from the chute entering the retorts; from defective side plates on the machines; from the sides of the coal drums, &c. The coal thus spilled is either lost down the coke hole or else is dropped on the stage. These losses may appear trivial in themselves, but in the aggregate they can become appreciable, if not alarming. For instance, a loss of say 4 tons in 6½ working days would amount to over 200 tons per annum. Investigation of such losses leads to their elimination. Care will reduce such losses, and all defects should be constantly watched for and immediately reported to the mechanical department.

Charger and Pusher Heads.

Charger and pusher heads should be inspected periodically to ensure that the dimensions are still to standard. Small heads tend to leave the coal distributed along the retort; consequently, when the head is withdrawn, having deposited a fall in the retort, the coal left behind is pulled out again. The result is that when the charge is completed it is very uneven and ragged. The heads can be tested with a standard gauge, allowing a minimum amount of wear. Any head smaller than the gauge should be condemned, and replaced as quickly as possible; spare heads always being kept available. Pusher heads should also be gauged in the same way, a minimum amount of wear being allowed. Gauges can be kept handy, so that those responsible for the upkeep of the stoking machines can test the heads at regular intervals.

The foregoing remarks are sufficient to show what form an inspection can take for the particular type of machines used by the South Metropolitan Gas Company. For other types of machines these tests would have to be modified to meet the changed conditions; but I have no doubt that suitable tests could be devised.

Travelling Rails.

While on the subject of inspection of retort house machinery, the question of the travelling rails on which the machines run should not be ignored, for loss of time and waste of energy can easily take place if there is much variation in the level of the rails. Only a slight variation is sufficient to throw the machine out one way or another, and the driver has to be constantly resetting the charging beam level of his machine. This is obvious, but it is so obvious that it is liable to be overlooked. The gauging of the rails and the reading of the levels ought to be regularly carried out, so as to ascertain variations in the gauge on each side of each retort house and the variation in the longitudinal and transverse levels. These variations of the rails should be corrected at the earliest opportunity.

Other High-Pressure and Low-Pressure Water Losses.

Other sources of loss of high-pressure water should be noticed by the works inspector; and one of these sources can be the cock and swivel box on the main hydraulic service, to which the flexible hose of the retort house machinery is coupled and uncoupled. This leakage can be estimated, and should be almost negligible if the cock is properly designed and attention paid to its upkeep.

Coke hole watering-down pipes and hoses can be frequent sources of leakage; and it is essential that these should be watched, for every gallon that runs to waste means that a further gallon of water must be pumped into the supply tank. It is surprising how much water can be lost through the accumulation of small leaks. Frequent examination of the pipes is very helpful. Accuracy must be unquestioned; and it cannot be too strongly emphasized that any lapse of time in reporting defects, or any laxity in bringing them home to the man responsible, renders nugatory the value of any inspection.

Packing Materials.

The quantities of the different packings and leathers used on the pushers have been carefully checked with the stores vouchers, and the publication of the costs has stimulated the mechanical department to save material wherever it can; each station competing with the other to bring the costs down to as low a figure as possible. Nine months ago this checking was extended to the cost of leathers and packing used on the hydraulic chargers, and is already leading to a reduction of the costs under this heading. Though the expenditure for packing material has come down to a much lower figure, it still fluctuates from quarter to quarter; but current figures show a considerable saving compared with those of the last two years.

Producers.

In order to maintain the producers in the highest possible state of efficiency, the covers under the feeding holes should be kept air-tight. If a sand-sealed cover is in use, the seal must be kept well filled. If a faced cover is employed, this must be accurately machined and designed to prevent warping under heat, and the clinkering doors to the grates should be as good a fit as possible.

In the first place, combustion is taking place where it is not desired—that is, on the top of the fuel at a point where the brickwork is usually not of a quality to stand intense heat—instead of in the combustion chambers where it is required. That is a loss in more ways than one. It means not only loss of fuel, but increased expenditure for covers and brickwork renewals at the feeding point. In the second place, badly fitting clinkering doors mean the indrawing of unknown quantities of air into the producers between the door and the frame, and delicate adjustment of the primary air slides and valves is impossible. Inspection of these two points is therefore desirable. An examination for leaks of every feeding frame and cover in the retort house should be made, and any indrawing of air through the sand seals or through cracks in covers or frames, if it be only a pinhole, should be reported as a leak. This will give an inducement to take care of the covers and to keep the seals carefully sanded, thus reducing to a minimum the pulling-in of unnecessary air. If cast-iron doors are employed, leakage of air through the clinkering doors can be very large; such doors warp badly with the heat. These doors can be tested for leakage as well as the feeding covers, but the test should be so devised as to distinguish between a door on which previous attempts have been made to render it airtight, and one that has been neglected. If the test can give the measure of the leak, so much the better. A standard steel dish door with valves—designed by Dr. Charles Carpenter—has solved the problem of a tight door for the South Metropolitan Gas Company.

Primary and secondary air slides should be carefully examined, and a note made of any which are chipped or broken. This is important if minute adjustments are to be made. Slides which have not been left set square in the boxes are generally due to their being badly fitting in the guides; and in all probability air would be drawn in all round the slide between it and the box. The primary and secondary air boxes ought also to be examined to see if they are free from obstruction—such as pieces of coke being left in them, &c. Then there is the question of the water supply to the producer grates. This should be properly adjusted so as to give a steady steam supply to the steps and the grates.

During an inspection, the composition of the waste and producer gases should not be overlooked. Samples of the waste

gas from a selected number of settings should be taken and analyzed. Each constituent can be averaged for each retort house or bench working; and if any setting be particularly bad, a special note should be made of it. Producer gas can be similarly treated.

Temperatures in the combustion chambers of all settings at work can be taken over a period arbitrarily selected. In order to get comparative readings, the period of carbonization in each retort during the period selected for review must be borne in mind. For instance, the temperature of the settings for 20-hour carbonization would be lower than for 10 or 12 hour work; and therefore the temperatures for these three periods of carbonization should be kept distinct from each other.

It is important that the coke drawn from the fires during the clinkering should be kept at as low a figure as possible, and a test devised to check this is very useful. One or more fires in each house can be arbitrarily selected, and the combustible matter in the clinker drawn out by the firemen ascertained.

RETORT BENCH FITTINGS.

An inspection of retort bench fittings for freedom from leaks by carefully examining the bench during the intervals between the draws, when everything is quiet in the retort house, is very useful, and should be done. Several draws may with profit be carefully watched during an inspection in order to ascertain whether the mouthpiece lids are closing properly. Now when a lid is shut, the catch should slip on the cross-bar readily, so as to cause no delay in shutting the door after the charge is deposited in the retort. This keeps the loss of gas down to a minimum, and also renders the work of the door shutter less arduous. Care, of course, must be taken to distinguish between bad fittings and delay in shutting due to faulty work on the part of the door shutter. A door may not shut properly owing to the cross-bar sagging, the catch having dropped, or—a more common fault than all—tar left on the flange of the mouthpiece through the carelessness of the front men.

The number of doors in action in each retort house, and the number which are seen closed, must be left to the discretion of the man examining them; but sufficient should be seen so as to give a firm idea of the upkeep of the fittings in the house. A lid should be deemed faulty if the door shutter has to make two or more attempts to slip on the catch, or if he requires the aid of one of his mates. These faults rarely appear if a proper system of inspection is maintained.

If carbon be allowed to grow on the mouthpieces to any great extent, it may seriously interfere with the discharge of the coke from the retort. Mouthpieces can, therefore, be tested with a suitable gauge, allowing for a maximum permissible growth of scurf on this fitting. This will considerably reduce the number of mouthpieces with excessive scurf, and also have an important influence in reducing the number of charges which hold up in the retort and will not push out readily. The gauge may be of any form suitable to find out these badly scurfed mouthpieces.

Stopped pipes should also be looked for; and one way of doing this is to keep every retort bench under observation for a period, though the periods need not necessarily be consecutive. All stopped pipes should be noted, but no pipe reported until the inspector has actually seen the caps removed and the pipe cleared. It can then be recorded either as a stopped ascension, arch, or dip pipe.

VACUUM GOVERNORS AND GAUGES.

The general cleanliness of the retort house vacuum governors should be impressed upon the top men. A proper supply of water should be maintained in the tank, the bell kept free from grease and fliers, and the water overflows to the governors kept free from obstruction. An inspection of the governors of this nature is sufficient to ensure that the attendant keeps them in proper working condition.

The vacuum gauges should also be brought under inspection. One can go into a retort house and see gauges in such a dirty condition that it is only with the greatest difficulty that the gauge can be read. It is highly important that those in charge should be able to see at a glance what vacuum is prevailing at any given moment; and this is only possible if gauge glasses are kept perfectly clean. Again, for a gauge to read accurately, it is important that the fittings should be kept tight. In any system such as we are discussing the gauges should, therefore, be examined as to their cleanliness and the facility with which the heights of the liquid can be seen at a reasonable distance. The glands should also be tested for tightness. All gauges should be kept tight and free from leakage. There is no need for me to point out that an error of 1-tenth of water recorded by a gauge will have an appreciable effect in the quality and quantity of the gas being made.

AUGERS.

A definite size should be laid down for this tool, below which it should not be allowed to wear before being withdrawn from use; for if small augers be used it simply means that the hard deposit is not removed from inside the ascension pipes. A limiting gauge should be kept in the retort house and the augers tried at regular intervals, and all those smaller than that of the gauge replaced. The works inspector should have a gauge of his own, and should try the gauge on every auger, and in his report state whether he found all correct or whether there were any below size. The number of doors opened at any one time during a slack out should be kept down to a minimum, and a definite rule be laid down as to the number of retorts it is permissible to have open at one time, this depending in the first place on the condition prevailing in the retort house. Here, waste can be prevented, as the retorts are kept in action to the last possible minute. Watch should be kept on every retort for this, and the foremen particularly should have the importance of this point impressed upon them. The mere fact of the knocking back of the eccentric lever should be deemed sufficient to count the retort as out of action.

The pressure (*plus* or *minus*) of the gas in the ascension pipe over the carbonization period of the charge can be ascertained by a suitable recording gauge, and can form a very useful check on the working of the retort house. Any pipe or pipes can be selected, and the highest and lowest pressure over the period under observation, reported; and if the proper inferences be drawn the conditions of carbonization of that particular bed are known. The variation in the vacuum, though the governors are apparently working satisfactorily, can vary as much as 1 to 2-tenths during the period between two slack outs, though the loading on the governor has remained unchanged. This is due to lack of sensitiveness of the governor, and from time to time the lag on the governors should be brought to the notice of those responsible for the working of them and should be noted during an inspection.

BOILER HOUSE.

All boiler fittings can be carefully scrutinized for steam and water leaks, and from samples of the clinker taken from the fires the combustible matter ascertained; this latter will keep a check on the fuel wasted when clinkering. The fuel supplied to the boiler houses can be examined for uniformity of size by putting through sieves or any other suitable means and the separated sizes weighed. The uniformity of size of the fuel has an important bearing on keeping the fires free from pockets and so preventing air escaping into the flues.

To make the inspection of the boiler houses complete, the composition of the waste gas up the shaft should be ascertained. This can be done by taking not less than a 24-hours sample of gas and ascertaining the CO_2 content; or if CO_2 recorders of any make are in use, two or three charts can be selected during the period of inspection and the average CO_2 content ascertained from them. After finishing the boiler house all the steam mains and services on the works can be examined for leakage of steam, and all steam engines, steam pumps, and valves also examined for leaking glands. This will lead to more careful attention being paid to bringing down what is after all a large source of waste on any works—a waste that is often overlooked.

ELEVATORS.

Another often fruitful waste is the unnecessary running of the elevators, particularly if the material supplied to them for lifting is intermittent, and they can very often be left running for quite an appreciable time without doing any useful work. A periodical investigation of the running of the elevators will often reveal the cause of the trouble, or a comparison of the quantity of material an elevator is lifting over a given period with the maximum it can lift.

PUMPS.

Pumps can be tested to ascertain their actual efficiency on the duty they are performing. It is often advisable to carry out two or three tests on a pump so as to be certain of its actual condition. The work can be so arranged that every tar, liquor, and water pump is tested at least once a year.

COKE PLANTS.

The grading of coke into various sizes to suit the requirements of customers, together with the weights supplied and the moisture content, has now assumed the greatest importance, and the examination of these weights should form part of the inspection. The weight of a certain number of sacks taken from vans in process of being loaded will tend to keep any variation in individual sacks within very small limits. When filling from a hopper, a common cause of over-weight is due to the fact that the loader cannot shut the slide until the scale pan begins to move, and quite an appreciable quantity of coke runs into the sack during the operation of closing the slide. A tendency thus creeps in to shut the slide before the scale pan drops, and this results in under-weight.

Sacks which are supplied by customers vary very considerably in weight, and hence the counterpoise for the weight of the sacks is not always correct and so another error can creep in. Though a load leaving the works may weigh correctly on the weighbridge, it is essential that the individual sacks comprising the load should be as near the correct weight as possible, and certainly not under weight. The grading of the coke can be checked by passing samples of coke of the various grades through sieves of the same mesh as the screens employed on the plant; the samples of coke being from sacks actually taken

off vans that have already been lodged. For instance, a sack of large coke—*i.e.*, coke over a certain size—can be selected from a van being loaded with that particular grading; it can then be passed in turn through sieves of all sizes corresponding to the screens. The quantities of each of the sizes can be sorted out and weighed. In this way a good check can be kept on the conditions of the screens and the coke grading and handling plants generally, and, should a bad example of coke be found, the attention of those in charge of the upkeep of the plant can be immediately drawn to it, and the reason of the fault investigated and remedied.

The moisture in the coke made during the period under review should be ascertained, for this has an important bearing on the quality of the coke sold.

Pressure Registers.

Incorrectness of water line, charts not being placed on the cylinder in the correct position, or the pen being either in advance or behind the true position it should be at any given time, are faults to be looked for when examining pressure registers. An examination of these points from time to time will keep faults down to a minimum. Shutting off the gas from the register and running the pen down to zero, and a comparison of the pressure shown by the chart and the corresponding "U" gauge will generally reveal where the faults are. Unless the pen is registering identically with the correct time the chart is valueless for detecting any errors in time or in pressure when changing the loading of the district governors.

Fire appliances and hydrants can also be examined to see if they are in proper working condition. In the case of the former it is essential that men employed in the particular building which is being examined should be fully acquainted with the method of using the fire dousers provided. The inspector should assure himself of this every time he makes an inspection.

Steam and gas engines can be examined to discover if the governor control is in working order, and if it is set correctly to come into action if the speed of the engine tends to rise above that set for it. This essential part of the engine is very often overlooked or tampered with by inexperienced persons. Every engine should have good governor control, no matter how small it may be, and should be tested periodically to ensure that it will not fail at the critical moment. Faults that can be looked for are mostly in the belt drives—pins slack on the link motions which renders them useless—glands so tight that the spindle actuating the steam control cannot move, and tensions on springs being wrongly adjusted. These faults generally mean that the governor comes into action too early or too late. Those immediately concerned with the control of the engine often do not realize the importance and function of the governors.

The time required for the inspection of a works must necessarily vary, but a report sent in weekly to the management will ensure that any defect is taken in hand and remedied as early as possible.

The work of inspection forms an excellent training ground for young assistants, who thus have opportunities of becoming thoroughly acquainted with all the details of the working of each piece of plant and the part it plays in efficient gas production, and at the same time cultivates their critical faculties. In considering the adoption of a regular works inspection the standard to be set should be high, and every encouragement should be given to reach that standard—enthusiasm should be aroused, and efficiency duly recognized. The cost of the inspection is more than justified by the economies resulting therefrom.

In conclusion I must tender my thanks to Mr. Thomas Curr, O.B.E., M.I.M.E., Works and Engineering Manager of the South Metropolitan Gas Company, for his kind permission to read this paper, and also for the facilities he has afforded me in preparing it.

Discussion.

The President said that they had listened to the paper with great interest; and no doubt the lecturer's remarks had made them think of the critical period through which gas undertakings had passed during the past weeks of severe frost. Had all gas concerns some inspection system on the lines outlined by Mr. Sims, perhaps it would have relieved their anxiety in regard to water pipes, and so on, during this critical time. Of course, many advantages accrued from an inspection system. The particular one described by the author had been in operation for some time, and was comprehensive. Mr. Kenshole said that one of the points which occurred to him was the influence of inspection on the maintenance costs of a works. Inspection enabled one to discover faults at their very beginning, and consequently the cost of remedying them at this stage was very much less than when the faults had been allowed to develop into serious defects. An inspection system would also stimulate a desire for cleanliness; there would be no leakages from steam mains and the like. And it was surprising how few people appreciated in the economic sense that every drop of water wasted had to be replenished. Maintenance of retort house fittings played a great part in the system dealt with by Mr. Sims; and they could not attach too much importance to this phase of the work. If a retort door happened to be leaking, they had in the primary stages of carbonization outleakage of high calorific value gas from the retort, and during the later stages in-leakage of air. The latter was liable to cause combustion in the ascension pipes—a prolific source of stopped pipes—and certainly affected the chemical composition of the gas by reducing the hydrogen content. Moreover, in-leakage of air affected the tar adversely. Another point of importance, continued Mr. Kenshole, was the testing of the material withdrawn from the producers during clinkering; and in this respect it was surprising how much combustible matter could be withdrawn. At Lea Bridge they had studied this question some five years ago, and had discovered a considerable proportion of combustible matter in the clinker. By re-organizing the system of clinkering, this percentage had been reduced to what was now a very low figure, and this naturally lowered the costs of handling and transporting the clinker. Mr. Sims had emphasized the importance attaching to the size of augers employed; and there could be no question that at present they did not pay sufficient attention to this matter. The ascension pipe, for example, might have a diameter of 8 in., and at the same time they might be using an auger having a diameter of only 5 in. The wear which normally took place in augers during use was very small, and for this reason it was apt to be overlooked. With the system in vogue in the South Metropolitan Gas Company, if the ascension pipes were 8 in. in diameter, and the augers 7½ in. in diameter, then the pipes could be kept free from any matter which might collect on the interior surfaces. The system indicated how every junior member of the engineering staff of a gas undertaking could save money on the carbonizing process. At Lea Bridge they had had an inspection system in operation for some years, though it was not so comprehensive as that dealt with by the author of the paper. But they did know what repairs were carried out to valves, &c. The whole of the plant was set out on a card system, and they were able to tell at a glance how many hours each portion of plant had been in operation.

Effect of Inspection on Initiative.

Mr. E. E. Calvert (Gas Light and Coke Company) said that it was difficult to contribute to the discussion without criticizing the methods adopted by the South Metropolitan Gas Company, as these differed somewhat from those of most gas undertakings. Whether or not this was fortunate, he was not prepared to say; but he hoped that in the discussion he would hear something of the disadvantages, as well as the advantages, of works inspection. He understood from the author that the inspectors sent in a weekly report to the management. This being so, it appeared to him hardly necessary to have assistants at the works, for the inspectors themselves covered all the points which needed care and investigation. Some of the points, however, appeared so obvious as hardly to require inspection. The foremen themselves ought to see that such matters were properly looked after; and it was up to the engineer in charge of the works to see that this was done. Mr. Calvert said that he would like to ask a question: Did the inspectors tend to destroy the pleasure which the men took in their work; and did Mr. Sims imply that inspection actually cheapened the cost of the therm? It was obvious, of course, that the effect of inspection would be to increase the therms of gas per ton of coal carbonized; but it did not necessarily follow that it decreased the cost of each therm made. To get the best work out of a machine, continued Mr. Calvert, it was essential to know the character and the methods of the men who were operating it; and this knowledge could only be obtained by sympathetic observation of the workmen themselves.

Does the End Justify the Means?

Mr. P. F. Scarth (Gas Light and Coke Company) observed that the South Metropolitan Gas Company had a reputation for excellent technical results; and it was understood that the increased thermal output of recent years could be attributed to efficient technical control. In 1925 the thermal output of gas per ton of coal carbonized was 72·51 therms. In 1927 the figure was 73·76 therms, and in 1928 74·76 therms. He had noted, however, that the cost of salaries per ton of coal carbonized had risen from 4s. 7½d. in 1925 to 5s. 4½d. in 1928. Thus little had been gained in this direction, and, after all, what really mattered was the cost of the therm into the holder. Regarding the inspection of stoking machines, he would point out that, if electric machines were used, instead of the hydraulic type, then a check could be obtained by recording ammeters.

Mr. J. R. Waterfield (Gas Light and Coke Company) queried whether the system of inspection dealt with by Mr. Sims would be applicable to a works where there were many varieties of plant. The author had made no mention of the scurfing of retorts; and he (the speaker) wondered whether the inspection included this.

Mr. Sims replied that it did not.

Lag of Retort House Governors.

Mr. Waterfield, continuing, said that the author had mentioned that a difference of one-tenth in the vacuum on the retorts had an appreciable effect on their working. He (the speaker) would prefer to put this at 0·01 in. W.G. The author had not told them whether the depths of the hydraulic seals were systematically examined, or whether due account was taken of the lag in retort house governors. As they were aware, a particular loading was only effective when a definite volume of gas was passing in unit time. With regard to the tests made for the percentage of carbon dioxide in the gases in the combustion chamber, from what point were the gases sampled? Mr. Sims had not told them anything about the actual fuel consumption of a setting of retorts.

Mr. E. R. Willis (Gas Light and Coke Company) asked whether the work of inspection included investigation of the radiation losses from a retort setting. Also, he would like to know what method of coke quenching was adopted by the South Metropolitan Gas Company, and whether the moisture content of the coke was uniform. Finally, what was the cost of this inspection per therm of gas made?

Clocks Attached to Recorders.

Mr. M. Walker (Lea Bridge District Gas Company) agreed with Mr. Calvert that it was the duty of the works staff to look after

the points mentioned by the author in his paper. Intensive inspection of the type outlined might easily detract from the value of the workman by lessening the interest which he might have in his work. The author, when dealing with coal elevators, had not emphasized the well-known fact that this plant consumed much power due to frictional losses; and he (the speaker) wondered what form of lubrication was adopted by the South Metropolitan Gas Company—whether grease cups were employed, or some such pressure system as the "Tecalemit." With regard to fuel used under the boilers, he was not clear whether this was actually graded. He would like to know the combustible content of the clinker withdrawn from the producer, and whether this was sufficient to justify the use of a clinker washer. A point to be noted in connection with pressure registers was that the clocks on the recording mechanism were not by any means invariably correct.

Mr. C. J. VELLENOWETH (South Suburban Gas Company) asked whether district governors, station meters, and valves were included in the system of inspection carried out by the South Metropolitan Gas Company.

Mr. ROY SUMMERSON (Luton Gas Company) queried whether gasholders were included in the system. Inspection, he said, undoubtedly led to improvements in the design of plant. As a case in point he mentioned annular condensers. Unless these were covered over at the top when not in use, corrosion set in inside the tubes. Regular inspection obviated such matters.

Mr. J. H. GOLDSMITH (South Suburban Gas Company) asked what proportion of the increased efficiency of the South Metropolitan Gas Company during recent years could be put down to the system of inspection described by Mr. Sims. He (the speaker) thought that inspection might be carried too far from the economic point of view, and actually become a financial burden. If the author could supply them with figures relating to the cost of inspection, this would be most valuable.

A BATTERY OF QUESTIONS

Mr. LEONARD LACEY (Gas Light and Coke Company) said that he agreed with Mr. Scarth in his observation that the excellent technical results of the South Metropolitan Gas Company were in themselves sufficient to make them all anxious to learn in what manner they were achieved. There was no doubt that inspection enabled one to rectify faults at their source. With regard to the tests applied, it would have been interesting if the author had told them something about the standard required. Mr. Sims had stated that two complete inspections of the Company's retort houses proved that the system had its weaknesses. The difficulty of appraising the condition of the retort house proved very difficult; and no matter how impartial the inspector was, an element of bias seemed to creep in. So the whole matter was again reviewed, and a system of testing was devised which left nothing to the judgment of the inspectors. This statement, said Mr. Lacey, was not quite clear to him. Of course, the Arrol-Foulis charger was a machine peculiarly influenced by the personal element. With regard to these machines, what was the time between charging successive retorts? As to the water consumption, this could not be measured accurately without considerable trouble. The machines were affected by the size of coal. It was possible to break coal to a certain size; but what was to be done about the fines? Was there a method of testing the weight of the charge? It would have been interesting to know the standard of the producer gas and the waste gases. At what point was it considered necessary to draw the attention of the management? Some report on the scurfing of retorts would, he thought, have been useful. With regard to water gauges, it was, of course, difficult to read them if they were dirty; and for this reason he suggested that the dead-beat type with large dial was more applicable. A point of great importance was the weighing of coke. He understood that in the South Metropolitan Gas Company the sacks were weighed; and there was a reference in the paper to a possible source of error in loading out of hoppers. It was stated that the counterpoise might not be correctly set. To what type of weighing machine was the author referring?

Mr. GRANT (Gas Light and Coke Company) suggested that the author ought, in his reply, to point out the results of the inspection system he had outlined in his paper.

THE AUTHOR'S REPLY.

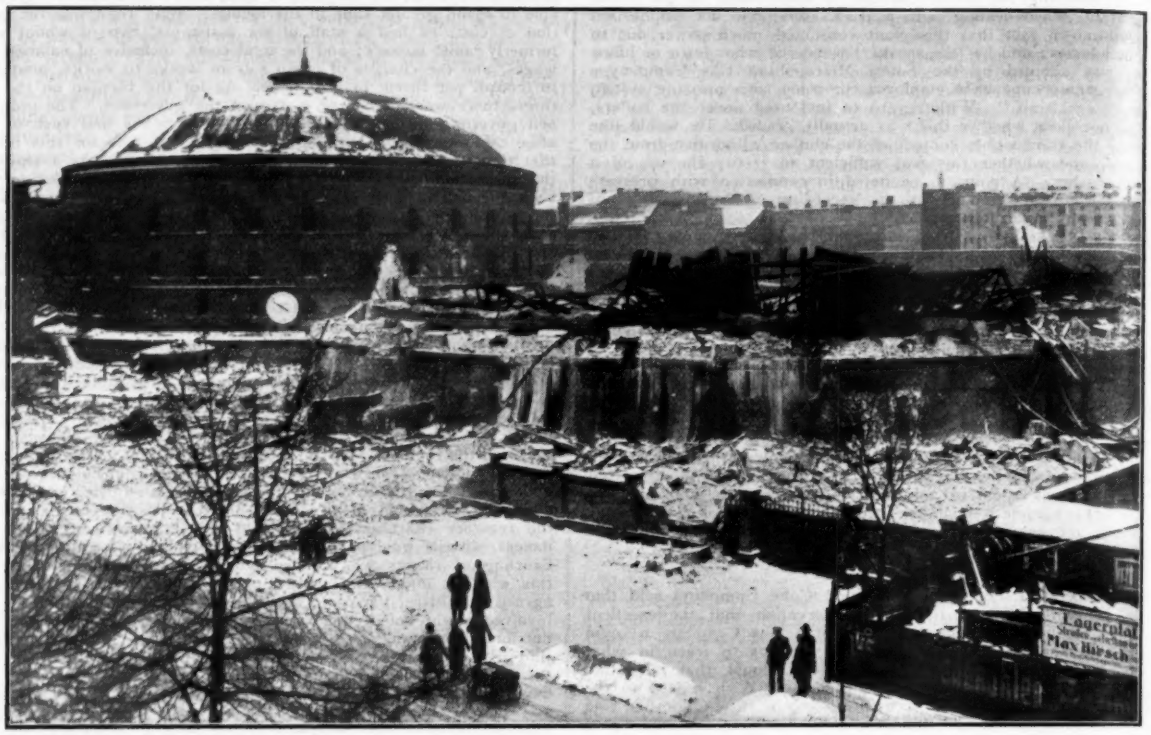
Mr. SIMS, replying to the discussion, said that Mr. Kenshole had mentioned the size of augers. In the South Metropolitan Company the ascension pipes had a diameter of $5\frac{1}{4}$ in. The augers were $5\frac{1}{8}$ in. in diameter, and were rejected when this diameter, due to wear, was reduced to $4\frac{3}{4}$ in. As stated, the inspectors sent in their reports weekly. During the course of their routine they carried out a certain number of tests. These were recorded, and sent in to the management. Particular faults were referred at once to the engineer. It was not true that the inspectors were in any way encroaching on the ground of the technical assistants. The latter, when they went round the retort houses, found certain faults; but they had not time to count the number of leakages, and so on. It was thus necessary to have some man whose sole duty it was to study details. The people at the works did not regard the inspection staff as policemen, but they realized that they were out to help. No engineer of a works had time to dive thoroughly into details. The inspection system so encouraged the foremen that the latter asked to be shown the faults, to avoid any breakdown. The men also appreciated the system, for they found that, as a result of it, they were able to spend greater time in the lobbies. With regard to the question of cost, he had a staff of six assistants, two of whom were formerly boiler stokers; and the total costs, inclusive of salaries and wages, and the charges of moving from works to works, amounted to 0·004d. per therm of gas made. As for the vacuum on the settings, there was, of course, a lag on the governors. The ordinary bell governor did not respond immediately to the first rush of gas after the retorts had been newly charged. It was for this reason that the time-lag was reported between the draws. As a result of the inspection, several minor alterations in governor design had been effected. Guides had been dispensed with, and so on. Tests for carbon dioxide were made through the sight box communicating with the space beneath the nostrils; the gas being sampled by a silica tube not less than 4 ft. in length. The total combustible matter in the clinker varied between 16 and 20 p.ct. on ordinary inside, step-grate producers. It was not the work of the inspectors to measure the radiation losses from the settings. Nor was notice taken by them of the lubrication of elevators and conveyors, though he might mention that Stauffer's lubricators were employed. With regard to boiler house fuel, all the boilers were fired with coke breeze; and it was the duty of the inspectors to prevent large coke from getting in among the breeze. If large pieces were fed to the boiler, they were consumed relatively rapidly by the air blast, and in consequence holing of the fuel bed took place, thereby reducing efficiency and lowering the content of carbon dioxide in the waste gases. He agreed that the clocks attached to recording mechanism did not always keep good time; but in each house there was a clock adjusted every twelve hours to Greenwich Mean Time; and the position of the pen on the recorder chart was timed with this standard clock. Station meters, district governors, and ordinary valves were not inspected. Scurfing of retorts was carried out to a regular time-table; but this was not under the purview of the inspection department. He agreed that inspection could be carried to such a pitch that the cost involved might defeat the object in view—that of cheaper gas production. However, the exercise of a little common sense was all that was necessary to prevent this happening, and, as he had said, the costs were very small. The relations between the inspection staff and the rest of the staff were most cordial. Before the inspection system was inaugurated, considerable delay was experienced, for example, in shutting the doors of the retorts. This was now remedied. It had been found that lids did not close because tar had been left on the mouthpieces. Formerly the retorts were put under pressure for inspection purposes. It was now sufficient to walk round the house ten minutes after the draw, and note the leaky doors. Mr. Lacey had spoken of the Arrol-Foulis machine; and he agreed that its working depended on the human element. A quick man, for instance, could carry out the operation in 5 seconds less time than a slow man. However, now only 4 seconds difference was allowed between the fastest and the slowest worker. Measurement of water consumption was a simple matter. It was only necessary to interpose a high-pressure meter. The charges were weighed. The coal from the crusher was sieved, and the amount of coal over a certain size noted and reported. When this quantity was in excess of a definite limit, it was usually found that something was wrong with the crusher; and the latter was thereupon examined. With regard to the standard of the waste gases, reports were made if the carbon monoxide proportion reached 3 p.ct. The average carbon dioxide content was from 19 to 20 p.ct. He agreed that dead-beat dial gauges were good; but when water gauges were in use, it was advisable to keep them clean. Coke was weighed on pan scales beneath the bunkers; an empty sack being used as a counterpoise. In this respect, his point was that sacks weighed anything between 2 lbs. and 18 lbs.; and it was thus necessary to take an average weight to avoid error. In reply to the point about which Mr. Lacey was not clear, he might explain that the original idea was to give so many marks for leaky doors, &c., and assess each house according to the number of marks. This, however, led to a comparison which was not valid, and brought in certain difficulties. The system had therefore been altered to a simple record of the number of lids examined, and the number of these lids found leaking. With regard to fine coal, the drum of the charger could be altered to vary the quantity of coal put down. If set at a capacity of (say) 90 lbs. with coal of a certain size, then excess of fines might result in a delivery of between 95 and 100 lbs. On the other hand, if the coal were unduly large, the delivery might be between 80 and 85 lbs. If the average coal size was 1 in., then the quantity over 2 in. should not be allowed to exceed 2 p.ct. of the total, so that the drum would throw at the capacity at which it was set.

VOTE OF THANKS.

Mr. T. H. PRATER (Isle of Thanet Gas Company), proposing a vote of thanks to the author for his paper, pointed out that the contribution emphasized unmistakably the importance of purchasing only the best valves, and so on, to obviate leakage and loss of time in inspection and remedy. The vote was seconded by Mr. CALVERT; and Mr. SIMS briefly replied.

Address on Smokeless Fuels at Harrogate.—Dr. J. A. Roelofsen, of Saltburn, addressing the Harrogate Rotary Club on Feb. 26 on smokeless fuel, said that 3 million tons of soot was annually deposited in Great Britain, representing the equivalent of 3 days' national output of coal. Contrary to general belief, it was the domestic fireplace that was the chief offender, for, with some exceptions, the coal used in factory boilers was more completely burnt than that used in the homes. After much research in low-temperature carbonization, there were now placed on the market solid smokeless fuels which would enable the country largely to overcome the smoke nuisance, and at the same time preserve valuable bye-products for more economical use. It had not been an easy task to produce a fuel which would burn brightly without smoke, and which, without alteration to existing grates, would have a cheerful appearance, and heat a house efficiently, and at little less expense than good household coal. There were, however, several processes and types of plant which met these requirements, and no doubt there would be further developments.

BERLIN HOLDER EXPLOSION.



Up to the present, there is very little of technical interest to add to the general accounts in the Daily Press of the wreck of a gasholder, which occurred at the Sellerstrasse Storage Station of the Berlin Municipal Gas Department on Feb. 16.

"Das Gas- und Wasserfach" for Feb. 23 reproduces the account issued for publication on the 17th by the Magisterial Press Bureau, which reported the bare facts of the case. Towards 3 o'clock in the morning the explosion occurred in one of the four holders at the station, and the cause was unknown. There was no damage of any consequence to surrounding property, and fortunately no loss of life. Two passers-by were slightly injured and detained in hospital, and four others were able to be discharged to their homes. There was no interruption whatever of gas service or of street lighting. Inquiry into the cause was being instituted forthwith.

To this brief report was added another on the 18th, which stated that the cause was still a mystery. In the whole history of gas supply extending over more than a century there had been no occurrence, either in Germany or elsewhere, showing similar characteristics, and a commission was being set up to test all possible theories.

Our contemporary adds that the capacity of the wrecked holder was 36,000 cub.m. [about 1,270,000 c.ft.], and it was enclosed in a brick structure similar to that shown in the left background of one of the pictures. At the time of the explosion it contained 26,000 cub.m., and was set for filling. It may be assumed that the explosion occurred in the space between the holder itself and the circular enclosing wall of brickwork, which, with the exception of the foundations, was completely demolished. The holder envelope itself was not lifted away by the explosion, and it lies collapsed in what remains of the circular wall.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

The Great Frost and Gas Outputs.

SIR,—Most gas engineers and managers of any experience of abnormal weather, or upheavals in industrial strikes, are aware of the proverbial short-lived memory of the public when it comes to "paying the piper;" and I enclose, as a matter of passing interest, copy of a sheet which is being supplied to my rental clerks and collectors, ready for the March accounts.

Therein is set out the daily output of gas on the corresponding days of 1928 and 1929, the increased output both in volume and percentage, and a reminding note.

This I consider useful information which will enable the rental clerks and collectors to deal intelligently with complaints.

J. F. TYNDALL,
Manager.

Gas-Works, Deal,
Feb. 28, 1929.

[ENCLOSURE.]

The Great Frost of February, 1929, as it Affected the Output of Gas from the Deal Gas Works.

[Total Holder Storage Capacity, 540,000 C.Ft.]

To 6 a.m.	Feb., 1929.	C.Ft. 1928.	C.Ft. 1929.	Increase Over 1928.	P.Ct.	Remarks.
Monday .	11	547,000	623,000	76,000	14·0	Frost commenced overnight
Tuesday .	12	559,000	700,000	141,000	25·2	..
Wednesday	13	558,000	766,000	208,000	37·1	Outside temp. down to 20° Fahr., equal to 12° of frost at night
Thursday .	14	557,000	751,000	194,000	35·0	..
Friday . .	15	546,000	733,000	187,000	34·2	Shops closing day, Thursday
Saturday .	16	570,000	776,000	206,000	36·1	..
Sunday .	17	571,000	777,000	206,000	36·1	Record day output to date
Monday .	18	539,000	650,000	111,000	20·6	..
Tuesday .	19	527,000	704,000	177,000	33·6	..
Wednesday	20	542,000	710,000	168,000	31·0	..
Thursday .	21	573,000	674,000	101,000	17·6	Day temp. rose to 56° Fahr.
Friday . .	22	536,000	627,000	91,000	17·0	Shops closing day, Thursday
Saturday .	23	579,000	644,000	65,000	11·2	Day temp., 53° Fahr.; night, 41° Fahr.
Sunday .	24	569,000	654,000	85,000	15·0	No frost, day or night
Monday .	25	504,000	600,000	96,000	19·0	..
Totals .	..	8,277,000	10,389,000	2,112,000	25·5	15 days

A Reminder—For the Information of Rental Clerks and Collectors.

Note, at the March quarter rental, the abnormal increases of gas output which occurred in February. Gas was not blown away for fun; someone has used it—and someone has to pay for it!

Be Prepared for Complaints of Gas Accounts.

Deal and Walmer Gas Company's Sports Club.—The third annual dinner and social evening of the Deal and Walmer Gas Company's Sports Club was held on Friday evening, Feb. 22, at the Masonic Hall, Sondes Road. The guests of the evening included the President, Mr. J. F. Tyndall (in the Chair); Alderman A. W. Lambert, representing the patrons of the Club; Mr. J. J. Paterson, Manager of the Dover Gas Company; Mr. B. L. Hougham, and others. After honouring the toast of "The King," the following toasts were submitted: "Deal and Walmer Gas Company's Sports Club," "Patrons, President, and Vice-Presidents," "Deal and District Junior Football League," "Visitors," and "Artistes, Caterers, and Stewards," and replies were duly given. Mr. S. D. Marsh, one of the joint Hon. Secretaries, replying to the toast of the Club, gave details of its work and achievements. A full and much appreciated musical programme was rendered by members of the Club and their friends.

The Dangers of Sliding Chandeliers.—By a strange coincidence the danger and unreliability of the old-fashioned water-chamber gas chandeliers has been brought before the public's eye by three accidents (resulting altogether in four deaths) in widely separated districts—Liverpool, Bath, and Sheffield—in each case the trouble arising from a fault in a sliding chandelier. In the first instance, Mr. J. Roberts, of Sefton Park, Liverpool, was found dead in bed with gas escaping from a three-light chandelier in the room. This fitting was probably more than twenty years old, and was found to be short of water through the outer tube being split, thus allowing the gas to escape. At Bath the victims were Mrs. A. Broom and her granddaughter; and in this case the escaping gas from the empty container of the chandelier in the room beneath had apparently percolated up through the floor. At Sheffield a faulty chandelier was again believed to be responsible for the death of Mr. and Mrs. R. Holderness on March 3. In returning a verdict of "Accidental death," the Liverpool Coroner said he should like the public to be warned how dangerous these old-fashioned chandeliers were unless they were given constant attention.

PARLIAMENTARY INTELLIGENCE.

[From Our Special Correspondents.]

HOUSE OF LORDS.

Gas Undertakings Bill.

The Government Gas Undertakings Bill was originally put down for Second Reading on Tuesday, Feb. 26, but was not taken on that date owing to the lengthy debate on the Local Government Bill. It was then put down for Thursday, Feb. 28, but was not reached until 7.30, when the House was on the point of adjourning.

The EARL OF LUCAN, who was in charge of the Bill, said that, on account of the late hour, he proposed only formally to move the Second Reading of the Bill. He understood that Lord Banbury of Southam had certain criticisms to make, but that he would bring them forward on the motion to go into Committee.

Lord BANBURY OF SOUTHAM said that he objected to certain clauses in the Bill which perpetuated the old abuse of giving Departments powers to make regulations, but that owing to the time, and on the understanding that his position was not prejudiced, he would reserve what he had to say until the Committee stage.

Lord ARNOLD, on behalf of the Labour Party, said that he quite recognized that no discussion was wanted then, and he was willing to fall in with the arrangement. He would only say at that moment that, as far as the Labour Party in the House of Lords were concerned, they would give support to the Bill.

The Bill was then read a Second Time, and referred to a Committee of the whole House. The Committee stage was taken yesterday.

Private Bills.

The Wandsworth, Wimbledon, and Epsom District Gas Bill has been referred to a Select Committee under the Chairmanship of Viscount Chelmsford, consisting of the Earl of Glasgow, Viscount Chaplin, Lord O'Hagen, and Lord Wraxall. The Committee meet on Wednesday, March 11, but have several other Bills to deal with before taking the Wandsworth Bill.

HOUSE OF COMMONS.

Gas Explosions.

Mr. DAY asked the President of the Board of Trade whether, in view of the gas explosions which had taken place in the streets of London during the last few months, any officers of his Department had had an opportunity of testing during that period any new inventions which it was claimed would prevent gas explosions, and whether the results had been satisfactory.

Mr. H. WILLIAMS said that attention had been called to one device of the kind in question. A Commission of Inquiry were considering the question of how the risk to life and property caused by gas explosions could be minimized; and until they had reported, it would be premature to consider the merits of particular devices.

Mr. DAY asked if he did not think it would be desirable to test the device to which he referred, with a view to preventing any future accidents of this kind.

Mr. WILLIAMS said it would be rather a mistake to consider particular devices until the Commissioners had diagnosed the probable causes of the disasters.

Frozen Gas Pipes.

Sir FRANK SANDERSON asked the Minister of Health whether, in view of the danger to the health of the public and the inconvenience caused by frozen water and gas pipes during spells of cold weather, such as were now being experienced, he would take steps to see that all new houses that were erected had their piping installed in such a way as not to be subject to weather conditions, as was the practice in countries which had every winter to meet such conditions.

Mr. CHAMBERLAIN said he was advised that the adoption of the suggestion would add appreciably to the cost of building small houses, and he doubted if this disadvantage would be counterbalanced by the advantage secured.

Water Heating Apparatus.

Mr. DAY asked the Minister of Health whether, in view of the fact that his Department had approved of the use of proper water heating apparatus for bathrooms in the City of Bristol, he would recommend other local authorities to give special attention to this matter, so as to lessen the dangers of death from carbon-monoxide poisoning.

Mr. CHAMBERLAIN replied that the question evidently referred to his approval of by-laws submitted by the Bristol Corporation under powers conferred on them by a local Act. Other local authorities had not, at present, power to make by-laws of this kind.

Gas Light and Coke Company's Bill—Opposition Withdrawn.

The twelve petitions presented against the Gas Light and Coke Company's Bill have now all been withdrawn as the result of negotiations with the various Gas Companies and Local Authorities concerned; and the Bill has now been referred to the Committee on Unopposed Bills. This Committee consists of the Chairman of Ways and Means (Mr. J. F. Hope), the Deputy-Chairman (Mr. D. H. Herbert), Mr. Cape, Mr. Oakley, and Sir Frederick Liddell. The South Suburban Gas Bill is also referred to this Committee, which meets today at 3 o'clock.

The petition of the Llanelly Gaslight Company against the Llanelly Corporation Bill has also been withdrawn.

Plans have been deposited in connection with the Alton and District Gas Special Order.

MISCELLANEOUS NEWS.

IMPERIAL CONTINENTAL GAS ASSOCIATION.

Extraordinary General Meeting.

An Extraordinary General Meeting of the Association was held at Winchester House, Old Broad Street, E.C., on Thursday, Feb. 28, 1929, for the purpose of considering the provisions of a Bill to be promoted in the present session of Parliament to confer further powers upon the Association. Col. H. Le Roy Lewis, C.B., C.M.G., D.S.O. (Chairman of the Association) presided.

The General Manager (Mr. F. H. James) read the notice convening the meeting.

The Chairman said: It may not perhaps be considered apposite for remarks of a purely domestic character to be made at a meeting convened solely for the purpose of considering the merits of a Parliamentary Bill, but I cannot forget that this is the first time I have had an opportunity of addressing our proprietors as the Chairman of this Association, and I therefore do not feel inclined to let the occasion pass without referring to the sad event which has deprived us of the long and tried services of our late Chairman.

Sir Charles Jessel was appointed by the Board on the proposition of his father-in-law, Sir Julian Goldsmid; and I may perhaps be allowed to state that I was appointed at the suggestion of Sir Charles, so that I sincerely trust that the fine example set by him may be followed by me. For 33 years our late Chairman served this Association faithfully, fifteen years of which were spent in the capacity of Chairman; and it is not exaggeration to say that the "I.C.G.A." was the leading thought of his life. He set for us, his successors, a standard of devotion to duty, honesty, and integrity which it will be hard for us to emulate and impossible to surpass; and it must ever be the endeavour of all the controllers of the fortunes of our undertaking to deserve the high elogium which it is my duty to pronounce now.

Apart from his public activities, he was my intimate friend, honest and true to me; and I am sure that our proprietors will forgive me for the natural emotion which I feel in making this reference to him. For over 25 years I was closely associated with him as a brother Director, and during part of this time as his Deputy-Chairman, so that I have had very special opportunities for appraising the high standard to which he undoubtedly attained.

In closing my reference to Sir Charles Jessel I may perhaps add that his fine example has moulded a high tradition in the conduct of our affairs, and that his influence for good will be felt so long as this Association continues its honourable career. I hope that you will allow a copy of this, my speech, to be forwarded to Lady Jessel, with your endorsement of these remarks as an expression of our proprietors' gratitude for the services of our late Chairman. ["Hear, hear."]

Rise in the Price of the Association's Stock.

There is one other matter to which I should like to make reference before I turn to the business proper of the meeting, and that is the phenomenal rise which has recently taken place in the price of the Association's stock. I will not comment upon that price, as the valuation which the Stock Exchange choose to place upon our stock is obviously a matter beyond our control; but in a few sentences I will endeavour to enlighten you in regard to the industrial and financial activities of this Association. For the last fourteen years the Association has been passing through very troubled times; the troubles being first those of the war, and, secondly, those which arose from exchange fluctuations. Such troubles now lie behind us, and for the first time for fourteen years it is possible to appraise the prospects of this undertaking as a commercial enterprise untroubled by political and financial complications.

The meaning of all this has not been lost upon the Stock Exchanges, both here and abroad. If you will turn to the pages of the Stock Exchange Year Book you will find details given of our holding in the Compagnie Continentale du Gaz en France, which is one of the leading gas and electricity companies in that country. The value of those shares has been increasing, and it is not unlikely that the market has made an intelligent appreciation of the existing situation.

In addition to the asset in the Compagnie Continentale, which is valued on the Paris Bourse, we possess a large number of assets of a kindred nature which are not valued on foreign bourses; but in so far as the optimism of the Paris Bourse in regard to our French holding is justified, the same measure of optimism is justified in regard to the value of our other undertakings.

In short, we have assets of great value; our revenues are increasing, and I think I may safely say that I share the optimism in regard to the future of our undertaking which is evidently felt by the London Stock Exchange, though I expressly disclaim any acquiescence in, or dissent from, the present price of your stock. [Laughter.]

New Act.

As you will have seen from the notice convoking this meeting, we have summoned you here to-day to enable us to effect certain changes in the Association's Acts of Parliament. As most of you are aware, this Company has been in existence for over a hundred years, and the constitution under which it works, though efforts have been made from time to time to modify it and to bring it up to date, is a survival from early company legislation. The Association is without most of the powers which are considered necessary to a modern company; and therefore your Board were faced with the necessity of either discarding the present statutory status and becoming an ordinary Limited Company under the Companies' Consolidation Act, or retaining the existing status and completely overhauling and consolidating the Acts of Parliament; yet again we might have dissolved the existing Company and re-incorporated the Association as a Parliamentary Company, but with an absolutely new set of powers.

Both the first and last of these courses would have involved us in very heavy stamp duties, and we have therefore adopted the second and middle course of retaining the existing Parliamentary status without re-incorporation; we are accordingly asking you to-day to approve a new Act of Parliament which will have the effect of cancelling all the preceding Acts and of giving the Association all the powers which a company ought to have.

I will give you a few instances which will demonstrate the obsolete character of the Association's Acts: It is open to doubt whether the Association has any power to make investments in undertakings which are not directly connected with the supply of gas and electricity. For instance, it is questionable whether we have any real power to make an investment even in War Loan and other Government securities. Through its Continental associations many fruitful opportunities of investment present themselves from time to time to the Association, but, in view of the doubtful character of our investment powers, your Board would not feel themselves justified in making such investments, though we ran the risk of indulging in the wild and adventurous course of investing a certain portion of our funds in War Loan and other British Government securities. [Laughter.] If it had not been for the action of your Board in departing from the strict letter of their very limited investing powers, it is very doubtful whether the claims of the debenture holders could have been met during the war, when most of our foreign stations and investments came under enemy control.

If you give us these new powers, we have no intention of departing from our policy of prudent finance; but, in my opinion, the essence of prudence is to spread our investments over as wide a field as possible, more particularly as the Association, through the force of circumstances, is assuming more and more the character of a holding Company and less and less that of an operating Company.

Within the last fifty years a new rival to gas has sprung up in the form of electricity, and the Association is fortunate in having a foot in both the gas and electricity camps. In this scientific age, it is not improbable that some new form of energy may be discovered, and prudence dictates that the whole of the Association's capital should not be tied up in gas and electricity, but that we should lay off a part of our risk in other directions, whether by investing in Government securities or by taking a participation in other companies such as general financial trusts, for often your Board are able to satisfy themselves, from personal knowledge of the inner workings of such trusts, that such an investment would be to the advantage of our proprietors.

Your Board has realized for some time past that if the Association is to continue to prosper in the future as it has done up to the present, it is necessary to give our policy a somewhat different orientation. The day is fast passing when public bodies on the Continent of Europe will allow foreign companies to undertake their gas and electricity supply. We have, therefore, recently adopted the course of turning our Belgian gas and electricity enterprises into Belgian companies in which naturally we retain a controlling interest and hold the majority of the shares. This policy will enable us to interest the municipalities in our local enterprises and to exchange participations with other local public utility undertakings, so that a much closer co-operation with foreign interests in general can be realized.

This will serve to explain to you my remark that the Association was becoming more of a holding and less of an operating Company, for where, formerly, it had gas and electricity stations, it will now hold, in their stead, gas and electricity investments. We have thought it desirable, while taking the investment powers which are necessary for our purpose, to make these powers as wide as possible, so as to cover not merely such operations as the Association has actually in view, but also other investment operations which may easily present themselves when our powers allow us to take advantage of them.

Employees' Pension Fund.

Another point upon which the Association's powers are in doubt is its right to constitute a proper pension fund for its employees. Naturally, owing to the re-organization of the Association's foreign business which is taking place, our pension liability will in course of time be considerably reduced, but I think it would be your wish that the Board should have the powers which it has exercised in the past to set aside sums for the purpose of paying pensions to all employees who serve you faithfully and well. ["Hear, hear."] As you are aware, a pension fund does exist, but it is our desire to cover it with the cloak of legality, and perhaps in the near future to place that fund on a proper basis by converting it into a trust fund.

Capital Powers of the Association.

The next point to which I wish to direct your attention concerns the capital powers of the Association. Under our present Acts, each time we wish to increase our authorized capital it is necessary to apply to Parliament, and in the ordinary course of events the necessary statutory power may take anything from six to eighteen months to obtain. The change which we now propose to effect will enable you

proprietors in general meeting to vote an increase of capital without resort to the laborious and somewhat expensive process of obtaining a new Act. At the present moment our authorized capital stands at £2,376,000 and our issued capital at £1,976,000—that is to say, we have a margin in hand of unissued capital of only £400,000. This is a totally inadequate margin, and when Parliament has given us these extra powers I do not think much time will elapse before we approach you with the proposal to utilize them.

As some of you are doubtless aware, the Association already possesses power to form subsidiaries on the Continent; but a case recently arose in which the Association could save a very considerable amount of foreign taxation if certain of its ordinary financial operations were transacted, not by the Association itself, but by a separate English Company. It was discovered that the Association itself had no power to form such a Company, and therefore it was faced with the alternatives of continuing to pay unnecessary taxation, or of coming to a special arrangement with certain of its friends to undertake this operation on behalf of the Association. The Association is already a most unfortunate victim of double taxation, and therefore there was no hesitation as to which course ought to be pursued. A private Company was formed by certain of the Directors and of the London staff; the Association itself, owing to the limitations imposed by its present Acts, being able to take only a minority interest. In order to reserve to the Association the share of profit to which it was properly entitled, it was necessary to make a contract between the Association and this Subsidiary under which the Association lent the Company in question funds and received back the whole of the profit as interest upon the amounts advanced. The Company in question has achieved its purpose, and will be a source of very considerable profit to the Association; but it is, in my opinion, quite wrong that the Association should have to apply to others to create a mask to enable it to carry through behind that mask the perfectly legitimate object of saving from the clutches of the taxgatherer an unduly large percentage of the interest upon loans which it is necessary to make to the Association's foreign enterprises to enable them to carry through their programmes.

If the Association obtains the necessary powers to form English subsidiaries, the position will be regularized by making this Company a public Company in which either the Association has control or in which you proprietors of the "I.C.G.A." will be given an opportunity to take a direct interest by subscribing capital from time to time.

I may mention that for the past year this Company, working with a nominal capital of £1000 and borrowing funds as required from the Association, earned about £15,000. This Company is only in its infancy, and, given additional capital, there should be a large volume of business to be transacted with the Association's Continental Subsidiaries and other undertakings with which we are in contact.

I think the illustrations which I have given must have completely convinced you of the necessity for the Act which you have been summoned to consider to-day. Our present Acts make up a whole volume; and when any question of the interpretation of them has arisen, the most astute lawyers in the country have expressed their inability to give a very clear or definite opinion as to what our exact powers are. On the advice of Counsel, we propose to do away with all our present Acts and to substitute the very simple and concise Act which is before you to-day. I will emphasize, for the lovers of tradition, that no change of status of the Company is involved, and, for the lovers of economy, that the course which we wish to adopt is the one which we are advised will prove the cheapest.

In conclusion, I can only express the hope that you will approve this Bill, which has been the subject of much thought on our part. The greater flexibility of our powers should help us to undertake fresh business and to improve still further upon the increasing profits of the last few years. If it is your wish, I will now call upon Mr. Pettitt, the Association's Solicitor, to explain the Bill to you in detail.

Mr. PETTITT (of Messrs. Slaughter & May, Solicitors) described briefly the provisions of the Bill.

The CHAIRMAN: I will now put a resolution to the meeting, and, having put it, the opportunity will arise for any stockholder to make a speech expressing his objections, or move an amendment, or make a speech in approbation. The resolution is:

> That this meeting of the proprietors of the Imperial Continental Gas Association hereby approves the Bill proposed to be introduced into Parliament in the present session, entitled "A Bill to confer further powers on the Imperial Continental Gas Association, to repeal and re-enact with amendments the provisions of the several Acts governing the Association, and for other purposes," a print whereof has been submitted to the meeting.

Mr. H. G. PALMER: I have pleasure in seconding that.

The resolution having been put to the meeting and carried unanimously, the proceedings then terminated.

TOTTENHAM AND DISTRICT GAS COMPANY.

Annual General Meeting.

The Annual Ordinary General Meeting of the proprietors of the Tottenham and District Gas Company was held at the Company's Chief Office, 639, High Road, Tottenham, N. 17, on Tuesday, Feb. 26—Mr. HENRY WOODALL, M.Inst.C.E. (Chairman and Managing Director), presiding.

The notice convening the meeting was read by the SECRETARY (Mr. Edward J. K. Fussell, F.C.I.S.); and the Directors' report and statement of accounts for the year ended Dec. 31, 1928, were taken as read.

The CHAIRMAN, in his review of the year's work, said: The year 1928 has been one of steady, though not rapid, progress. Weather conditions were unfavourable from a gas point of view. We show, however, an increase of nearly 2 p.ct. This is somewhat disappointin, in view of the large amount of apparatus we have sent out, but during the cold spell we have recently experienced the result has been apparent, and during that period we have had an average increase of 25 p.ct., which is most encouraging. The increased output this year, up to date, is already slightly more than the increase for the whole of last year. For the first time for some years there has been a very slight increase in the capital per million cubic feet sold—almost imperceptible, but still the wrong way. This you will realize is due to the fact that there has been so small an increase in sales; had the calculations been made to-day instead of on Dec. 31 last, there would have been a decrease in the capital per million sold.

PRICE OF GAS LOWER.

It is satisfactory to report an average reduction in the price of gas of nearly 4d. per 1000 c.ft. during the year. This represents a saving to our consumers of over £50,000, and enables us to distribute to you a further £3800 in dividend—not a very large share.

Last year I told you that we expected a reduction in the price of coal, and also in receipts from residuals. This has happened, and the net price of coal—the figure that matters—is down by 2½d. per 1000 c.ft., or less than the reduction in price.

You will have noticed that during the year we have redeemed £70,000 of 6 p.ct. redeemable mortgages and raised, partly to repay these, £155,875 of 5 p.ct. redeemable mortgages. By this transaction we have saved interest to the extent of £700 per annum. The 5 p.ct. redeemable mortgages we raised at 96¼ p.ct., repayable at par in 20 years. The whole of the discount on this issue we have paid off instead of spreading it, as we might have done, over the 20 years; the figure, £5455, you will see in the profit and loss account. Two other figures in the profit and loss account—viz., expenses of new issue £2744, and cost of Act £2486—have been dealt with in the same way, though they might have been spread over a period of years. You will, I am sure, approve our policy of wiping off this (in all, £10,686), none of which will recur.

FULL STATUTORY DIVIDEND.

There are no other special items in the accounts to which I need call attention. The result of the year's working is that we are paying the full statutory dividend, an increase of 7s. 6d. p.ct. We have paid £10,686 on special non-recurring items, we have added to our reserves £8648, and are then able to increase our carry forward, which now stands at £43,520, by £1100.

Our reserve funds, including special purposes and renewals funds, but excluding the carry forward, amount to £154,000; but of these funds only a small portion, £19,500, is invested outside the business. We shall endeavour, as opportunity occurs, to invest more of these reserves in liquid and sound securities. We should have been able to do more in this direction had we not had special regard to the pension and superannuation fund. The total of that fund is now £153,000, and is actuarily sound, and rather more than half—namely, £80,000—is invested outside our undertaking. This £80,000 represents more than the whole of the co-partners' contributions. Though, as I have said, our reserve funds are not fully invested, I may tell you that our land and freehold properties represent a much larger sum than the uninvested portion.

WORKS EXTENSIONS.

During the year we have enlarged and improved our works, both at Willoughby Lane and Ponders End, and our working results are consequently improved. The extensions and improvements reflect great credit on our Engineer, Mr. H. C. Smith. We are very sorry that we have not Mr. Smith with us to-day, but he is one of those unfortunate people down with sickness.

One very satisfactory feature of our business is the growth of gas used for lighting purposes. We have, during the year, fitted up two large factories with gas for lighting, and have added 268 public lamps, all in severe competition with electric light.

ABSORPTION OF WALTHAM UNDERTAKING.

Last year you gave us permission to apply to Parliament for power to acquire the Waltham gas undertaking, and for other purposes. We made the application, and though we were not able to obtain all the powers we asked for, we are satisfied with our Act, which in the end was unopposed.

The Waltham undertaking, under the Act, was transferred to us, and since the beginning of this year we have administered the added area. The Company was a well-managed one, but we hope and expect, with our larger resources, to extend the use of gas in the new area. The Act, like the quality of mercy, is twice blessed; it blesses him that gives and him that takes.

We have, since the Bill was deposited, reduced the price of gas in the new area by 6d. per 1000 c.ft., and also in the old area by 3d. per 1000 c.ft.

It was considered advisable, when asking for further powers, to obtain permission to appoint a Managing Director, and my colleagues have since done me the honour to elect me to this position.

Another provision was to consolidate our stocks. We have now only one ordinary stock instead of two. This simplifies a good deal of our work and is understood better by investors, and tends slightly to improve the value of the stock in the market.

Our electricity undertaking in Wood Green continues to prosper.

The increase in sales for the year was 22 p.ct., and, in spite of a reduction in price, the profit shown is greater by £1600 than in 1927. We have had to expend £12,200 on electricity capital account, and the per centum return on this capital is, in consequence, about the same as last year. The electrical undertaking is practically leasehold; the Wood Green Council having the right of re-entry on giving us one year's notice. The price to be paid under our 1913 Act will be quite a fair one, but we are satisfied to carry on as we are, and as far as we are able to judge there is no immediate likelihood of any transfer taking place.

Alterations to Head Office.

These Head Offices of ours were built in 1901, and the then Directors took what appeared to be a long view and built extensive premises. At that time the number of consumers was 19,000—it is now 105,000. The gas sold then was 700 million c.ft., and is now 3500 million c.ft., so that in 28 years we have increased fivefold. Considerable alterations and extensions are now necessary, and the cost will be somewhat heavy, as we must do it piece-meal—that is, keep on working while the alterations are being carried out—but it is essential that the work should be carried out without delay.

The position of the gas industry is very sound, and the consumers' demands, immediately cold weather comes, show that the advantages of gas are appreciated, and the various and varied appliances we are constantly sending out are meeting a want. Our climate varies considerably, and we experience greater fluctuations than formerly; but our product is there when wanted, and we have been able to meet the heavy demands made upon us without any inconvenience.

As you will remember, we were one of the earliest companies to adopt the use of carburetted water gas, and the flexibility of that plant is of the greatest advantage in meeting peak loads.

As I have said, since the cold weather set in there has been an increase in output of 25 p.ct. We can only hope that when their bills come in our consumers will realize the comfort of having gas in cold weather, and will not complain too seriously of the cost.

We are not satisfied with our treatment under the De-Rating Bill. Though we have tried hard to obtain recognition, it has been denied us, while some of our competitors have been given relief. It seems hardly fair that undertakings such as ours, paying reasonable dividends, admittedly treating our employees well, should be less generously treated than others. It sometimes seems to me that this Government is generous before it is just; the foolish virgins might have suffered a better fate at their hands than that which overcame them in the Gospel story.

Out-of-Date Legislation.

Gas legislation, though very sound, is now out-of-date. The most important Act governing the gas industry goes back to 1847. At that time the industry was in its infancy, and there was no electrical competition. The position is now altered, and it is time we had more freedom, especially with regard to the raising and security of capital and increase of reserves. I am glad to say that the Government have considered this matter, and our representations to them, through the Board of Trade, have been sympathetically received, and the Government has introduced a Bill to deal with some of our grievances. We only ask the freedom possessed by our rivals, so as to be able to compete on equal terms.

Co-Partnership Bonus.

It is pleasant to record the fact that the number of co-partners in receipt of a bonus during 1928 was 1298, as against 1172 in 1927. The actual bonus (gas and electricity) for 1928 was £10,836, and for 1927, £9309—an increase in 1928 of £1527. As a result of the increase in the dividend over the whole year, the individual co-partners received an increased bonus at the rate of 7s. 6d. p.ct. on their earnings.

In conclusion, I am glad to tell you that the good and cordial relations between Directors, staff, and employees continue to exist and improve. It is only by real co-operation that the results submitted to you can be obtained.

You probably miss some of your Directors to-day; and perhaps I ought to have mentioned this matter at the commencement of my remarks. I am very sorry to have to say that Mr. Henry Bailey (our Deputy Chairman) and Mr. W. A. Surridge are both away, due to illness. We very rarely find that any of our Directors are absent; they are extremely sorry not to be with us to-day, and I am sure we are all equally sorry that they are absent.

I now move:

> That the report of the Directors and statement of accounts for the year to Dec. 31, 1928, be received and adopted, and that the report be entered on the Minutes of the proceedings of this day.

Mr. George Hay Morgan, K.C., B.Sc., seconded.

There being no response to the Chairman's invitation to the proprietors to discuss or ask questions concerning the report and accounts, the resolution was put to the meeting and carried unanimously.

Declaration of Dividends.

The Chairman then moved:

> That a dividend at the rate of 5½ and 5 p.ct. per annum on the preference stocks, and £6 12s. 6d. p.ct. per annum on the ordinary stock, all *less* income-tax, be declared for the half-year ended Dec. 31, 1928, payable on and after March 1 next, and that the dividend warrants be sent to the proprietors by post.

Mr. A. E. Broadberry, M.Inst.C.E., seconded, and the resolution was carried unanimously.

Re-Election of Retiring Directors.

The Chairman, proposing that Mr. George Hay Morgan, K.C., B.Sc., one of the retiring Directors, be re-elected, said that Mr. Hay Morgan had been a Director for a considerable time; he was a man of very great experience, and a most useful, valuable, and pleasant member of the Board, and the other Directors hoped the proprietors would re-elect him, as he (the Chairman) had no doubt they would unanimously.

Mr. Thomas Goulden, M.Inst.C.E., seconding, heartily endorsed all that the Chairman had said of Mr. Hay Morgan, and the resolution was carried unanimously.

Mr. Hay Morgan thanked the Chairman for his kind remarks, and expressed his gratitude to the proprietors for this renewed expression of their confidence. He had been a Director of the Company, he said, for ten years, and it had been a pleasure and a privilege to work with his colleagues; he assured the proprietors that he would continue to do his level best to deserve their confidence.

The Chairman, proposing the re-election of Mr. Thomas Goulden, M.Inst.C.E., as a Director, said that Mr. Goulden's name was very well known to many people in the Company and throughout the gas industry. The Company was very fortunate in securing his services on the Board, and his co-Directors hoped the proprietors would vote that he should continue to serve.

Mr. Broadberry, who seconded, said that his co-Directors found Mr. Goulden a very valuable colleague, and hoped that he would be spared for a very long time to serve with them.

The resolution was carried unanimously.

Mr. Goulden expressed his hearty thanks for this expression of the renewal of the proprietors' confidence in him, and assured them that he would continue to do his very best to justify it.

Re-Election of Retiring Auditor.

Mr. S. Sandell proposed that Mr. John Eve, F.C.I.S., F.L.A.A., the retiring Auditor, be re-elected. Mr. Eve, he said, had served the Company well and truly for many years past, the accounts were a model of clearness and conciseness, and the proprietors had every confidence in him.

Mr. William Robertson, who seconded, also paid a tribute to Mr. Eve as a man to be depended upon, and whose work for the Company had been done thoroughly.

The resolution was carried unanimously.

Mr. Eve, returning thanks, said this was the 15th year he had had the privilege of auditing the Company's accounts. Though there had been a very considerable increase in the Company's business during that period, the accounts had been kept by the officials of the Company in an excellent manner, and it was indeed a pleasure to audit them. He hoped that the increase in business which had been effected each year would continue.

Vote of Thanks to the Directors and Staff.

Mr. J. Beale proposed a hearty vote of thanks to the Chairman, Directors, and Auditors, and to the officers, staffs, and workmen, for their services to the Company during the past year, and emphasized how efficiently and unitedly all of them worked.

Mr. C. Coventry, who seconded, said the proprietors knew that the Company was a happy family; they were very pleased to know that that state of affairs continued, and hoped it would always be so.

The vote of thanks was carried unanimously.

The Chairman, responding, said that all in the service of the Company enjoyed their work. It was perhaps easy to enjoy work which turned out to be successful. The Company had gradually improved its methods and its output, and was enlarging its business: and he felt that everybody concerned appreciated that, and enjoyed the work they did in connection with it. The addition of the Waltham area to the Company's area of supply would give them more work to do, and would add to the interest of the undertaking. Everyone who knew the Company's officers appreciated that the Company was extraordinarily well served. Their service was not only good, but it was rendered in a most pleasant and cordial manner. The same remark applied to the workmen. This Company was one of the older of the co-partnership companies; it had its insurance fund, and there were a number of pensioners; the whole of the staff and workpeople realized that they were not simply engaged to do a little bit of work and then thrown aside, but that after years of service there was a reasonable prospect for them, and that they could retire on a competence which was really sufficient to enable them to live in comfort for the rest of their lives. It was not often that anybody left the service of the Company after having entered it. He knew the proprietors wished the Directors to do well for their servants, and he believed the Directors did that. The recreation ground and club rooms were excellent, while the welfare scheme which had been started recently was very much appreciated by the men, and was doing a great deal of useful work. All the Company's servants worked very well together, and would try to continue to do so.

The Secretary also expressed appreciation of the vote of thanks, and said that Mr. H. C. Smith, the Company's Engineer, would have been glad of an opportunity to do so also. He added that the staff welcomed Mr. Woodall as Managing Director, for he had relieved them individually of a great deal of responsibility. The Chairman's remarks with regard to the provision of new offices would appeal to the staff very much indeed. The present chief offices were built in 1901, and the staff had really outgrown them, and they looked forward with a great deal of pleasure to securing more accommodation, which would give them greater convenience and comfort. The staff would appreciate very much the vote of thanks accorded them, and were always very willing to do their best in all matters.

BARNET DISTRICT GAS AND WATER COMPANY.

The Annual Ordinary General Meeting of the Company was held on Monday, Feb. 25, at the Cannon Street Hotel, E.C.—Mr. WILLIAM CASH, F.C.A., J.P. (the Chairman), presiding.

The SECRETARY (Mr. E. D. Davey, F.C.A.) read the notice convening the meeting; and the report of the Directors and the statement of accounts for the year ended Dec. 31 were taken as read.

The CHAIRMAN, in moving their adoption, said he was glad to be able to inform the proprietors that the 1928 Act was passed by Parliament without any opposition on the part of the local authorities. This was a satisfactory feature, and very different from the big fight in 1926. The main provisions of that Act were to give effect to the bargain which the Company had made with the Metropolitan Water Board. Under their 1926 Act they had obtained the right to take from the Board water as and when required; the bargain stipulating that the Company were to develop their existing stations so far as they were capable of development before calling upon the Board to furnish that supply. Naturally, as long as their own resources were available, they did not want to buy water from the Board.

A PENSION FUND ESTABLISHED.

The Act also gave them power to establish a pension fund; and he was sure that the proprietors would be glad to know that the Directors had taken the opportunity to institute such a fund for the benefit of their workpeople. They had had the advice of an eminent actuary as to what would be the proper and reasonable basis for such a scheme; and the fund had been arranged to come into force on Jan. 1 last. The scheme had met with enthusiastic acceptance by the men. It was a contributory scheme; the Company to contribute a like sum to that contributed by the men. For a few years a charge would appear in the accounts representing the sum necessary to provide for the back-service of those members of the staff who had been in the employ of the Company for a long time. It was interesting to note that the men were in favour of a contributory pension fund rather than a co-partnership scheme. In many gas companies these two were linked together; but co-partnership was not so easy to work in connection with a water undertaking as it was with a purely gas company. The men had decided in favour of a contributory pension scheme; and the Directors had adopted that idea.

THE ACCOUNTS.

Turning to the accounts, he said that the only expenditure had been on new buildings, mains, and meters. There had been extensions at the gas-works in connection with the retort house and purifying plant; and as regarded the water works, for additional cottages for the workpeople. There had been laid during the year about 3½ miles of gas mains and 4½ miles of water mains. Further capital would have to be issued in the near future, as the continually growing demand for gas would call for further extensions. Receipts for gas showed a substantial decrease of £6476. This, however, was due to the fact that the price had been steadily reduced. The prices charged per therm for gas during the four quarters of 1927 were respectively 12·5d., 11·5d., 11·5d., and 11d. For the corresponding quarters of 1928 the charges were 11d., 10·5d., 10·5d., and 10·2d. The last-named figure was, considering the geographical position of the Company, a very satisfactory one. For the two periods the receipts for gas showed a drop of 5·4d. per 1000 c.ft., while the net cost of coal had decreased 4·78d. Thus the whole of the advantage which had been derived from the net reduction in the fuel bill had been handed on to the consumers. The quantity of gas sold showed an increase of a little over 1½ p.ct., which was not unsatisfactory, having regard to the weather conditions. They had secured 498 new consumers during the year. Residuals had realized £2561 less; and coal and oil had cost £9124 less. Repairs and maintenance had also cost less; but there was the new item for the pension fund, amounting to £720 on the gas department and £530 for the water account. The gas profit for the year was down by about £1100. In the water revenue there had been a substantial increase of £7700; but in this connection it must not be forgotten that the Hatfield undertaking in 1927 was in their hands only nine months. Pumping charges showed a decrease of £1658, due to the lower cost of fuel and to the greater efficiency of the more modern plant now installed.

Summing-up the position from the profit-earning point of view, the profits from the two departments taken together amounted to £58,833, which compared with a profit for 1927 of £50,708. This was entirely satisfactory. Another new item which would be noted was the carrying of £3500 to reserve. The Company, because of their peculiar constitution, had been unable to put sums to reserve prior to the consolidation of their capital. This difficulty had now been removed, and they were proposing to build up a reserve fund. They were carrying forward a sum of £4800 more than was brought into account, and they had been able to strengthen the renewal funds for both water and gas. Unfortunately the Company had to mourn the loss of their Deputy-Chairman, Dr. Glaisher, who had for 30 years served them as a member of the Board. He was a most regular attendant at the Board meetings, and his knowledge of the affairs of the Company extended over a very long period. This knowledge of the past history of the undertaking was of great value to his colleagues on the Board. The Company were happy in the possession of Directors, all of whom were specialists in the matters with which they had to deal, and in these circumstances the Board thought there would be no advantage in filling the vacancy caused by the death of Dr. Glaisher.

The Company had, in common with all other gas companies, been passing lately through a period of abnormal stress and demand. This demand, he was happy to say, they had been able to meet fully in the matter of gas; but so far as services were concerned there had naturally been some difficulty in connection with the supply of water. He desired, however, to acknowledge the help which surveyors in the various districts had given them in this difficulty. With regard to gas, he might say that on one day they had sent out nearly 60 p.ct. more than on the corresponding day of 1928. The charges for water for domestic purposes were based on rateable value; and, as they were aware, the whole of the property was being re-valued. This would only affect the domestic revenue, and against any increase of income that might accrue in this respect there would have to be placed the fact that the Company's own undertaking was to be re-assessed. The charges would not be reviewed until June next, and it was hoped there would be no difficulty in arriving at an equitable arrangement between the Company and their consumers.

GAS LEGISLATION.

With regard to the general situation in the gas industry, there had been a good deal in the newspapers lately in reference to gas legislation. The National Gas Council and the gas industry generally had been urging upon the Government the necessity of some alteration in the law as it applied to gas undertakings. The matter had been under the consideration of the Board of Trade, and the National Fuel and Power Committee had produced a report, which had been submitted to Parliament in January last, making it quite clear that the gas industry had a real case for an amendment of legislation as it existed to-day. In the present state of Parliamentary procedure, the President of the Board of Trade felt some difficulty in putting forward anything in the nature of a comprehensive measure; but he had been good enough to prepare a Bill, which had been introduced into the House of Lords and ordered to be printed on the 19th of the present month. For that small mercy—he said "small" because it did not go very far—the gas industry were really devoutly thankful; and they ventured to hope that the fact that it was only an instalment of what was obviously fair and reasonable would not be lost sight of. The Bill was intended to be—and he hoped would be considered so by all parties—non-political and non-controversial. In other words, the matters covered by the Bill were so clearly fair and reasonable that there ought to be no difficulty in getting it made into an Act, although the time of Parliament was extremely limited. The intention of the Bill was to give further powers to the Board of Trade to assist in, and to make simpler, questions of amalgamation, joint working, and so forth, and to make it quite clear that the Board of Trade could deal with such questions as basic prices and minimum dividends. In that the Bill had the imprimatur of the National Fuel and Power Committee, to which those matters had been referred.

Mr. WILLIAM RICHARDS seconded the resolution.

Mr. PLUMER asked, in view of the satisfactory state of the Company's affairs, what was the position with regard to the payment of back-dividends.

The CHAIRMAN replied that the consolidation of the capital involved the abandonment of any claims for back-dividends. Against this, however, they had obtained certain advantages.

The report and accounts were then unanimously adopted.

On the proposition of the CHAIRMAN, seconded by Mr. SAMUEL CUTLER, a dividend was declared, for the half-year ended Dec. 31, on the ordinary stock at the rate of 7 p.ct. per annum, *less* income-tax, leaving to be carried forward a sum of £27,519.

The retiring Directors (Mr. Colin Docwra and Mr. Samuel Cutler) and Auditor (Mr. C. P. Crookenden) were re-elected; and a resolution was passed reducing the number of Directors from six to five.

The CHAIRMAN proposed a hearty vote of thanks to the Engineer, Secretary, officers, and staff; remarking that, from highest to lowest, all had worked with goodwill and loyalty.

Mr. TAYLOR seconded the vote, and expressed his approval of the establishment of the pension fund.

Mr. J. F. HASELDINE, M.Inst.C.E. (Engineer and Manager), in responding, said the workers greatly appreciated what had been done for them.

Mr. DAVEY also acknowledged the vote, on behalf of himself and the London staff.

The proceedings closed with a vote of thanks for their services to the Chairman and Directors.

Complimentary Dinner to Sir H. Maybury.—Lieut.-Col. Wilfrid Ashley, Minister of Transport, presided on March 1 over a complimentary dinner given at the Savoy Hotel to Sir Henry P. Maybury, on his retirement from the post of Director-General of Roads. Proposing the health of the guest, the Chairman, referring to Sir Henry's services as Director-General of Roads, described him as a man who seized a chance when opportunity offered. He was one of the first people who grasped that the construction of roads which was equal to horse-drawn traffic was not equal to mechanically propelled vehicles. It was Sir Henry who mainly devised and carried through the great traffic road scheme for the relief of unemployment, which had provided, not enough, but still in large measure, new arterial roads in the home counties. Lieut.-General Sir Travers Clarke and Sir Edward J. Holland supported the toast. Sir Henry Maybury, in reply, referred to the state of unemployment in the country after the war, and said that large schemes of road construction and improvement had been put in hand which had given useful and congenial employment to a great number of ex-Service men, who, until such works were commenced, never had had the opportunity after leaving the Army of finding any work.

GAS COMPANIES' RESULTS FOR 1928.

Further Records of Satisfactory Progress.

ANDOVER.

The Annual Meeting of the Andover Lighting and Power Company was held on Thursday, Feb. 28, at the offices, 6, Bridge Street, Mr. W. P. Clarke (Chairman) presiding. The Chairman moved the adoption of the report of the Directors, and the accounts for the year 1928. Turning to the accounts, one could say straight away that they had had a satisfactory year's trading. Their output had increased, and at the same time some of their expenses were down, and the eventual result was that the sum available for dividend was practically the same as last year. The actual increase for the year was in the neighbourhood of 3¼ million c.ft. sold. Distribution expenses were down £750. Meters and stoves were £750 down, and fittings showed a reduction of £570. On the other side of the account they found £850 reduction in the sale of gas, which seemed a lot of money until they took into consideration that during the year 1927 gas was gradually reduced from 1s. 4d. per therm until it commenced 1928 at 1s. 1d., which represented a reduction of 1s. 3d. per 1000 c.ft. Rentals of meters and stoves were higher in 1928, but coke was less, due to the lower prices charged to the public for that fuel. The balance to be carried down to the profit and loss account, £2793, was practically the same as the previous year, and enabled them to recommend a dividend at 6 p.ct. per annum. During the past year the Company had commenced the reconditioning of the old retort house; they were putting in two beds of horizontal through retorts that were to be fitted with electrically operated machinery. It was proposed to hold a lighting and cookery exhibition again during the spring, because last spring, when they had one, the public showed the greatest possible interest, not only in the cookery lectures, but in the exhibits of fittings; and they felt, as a utility Company, it was their duty to instruct the public in the economical use of gas. Mr. F. H. Sherwood seconded. An extraordinary general meeting was then held. The Chairman said the Directors, partly from their own initiative and partly from the advice of their accountants, were convinced that three classes of debentures, as were now existent, were unsatisfactory to the holders, and also to the Company, and that it would be much more satisfactory to have only one class. All the holders of debentures had been circularized, and favourable replies had been received in every case from the holders of the stock; and he therefore begged to move the sanction of the meeting to the issue of debenture stock at 4½ p.ct. under the provisions of section 32 of the Andover Lighting and Power Act, to replace the present issue of £11,000 in three classes of debenturgs. Mr. Sherwood seconded, and the resolution was carried.

BARNSTAPLE.

Moving the adoption of the report at the Annual Meeting of the Barnstaple Gas Company on Saturday, Feb. 23, Mr. F. W. Hunt, who presided, said the results of the year's working were satisfactory on the whole, and the general prospects such as to warrant optimistic expectations as to the future. The sales of gas amounted to 75,853,700 c.ft.—an increase of 2,495,600 c.ft. compared with the previous year—and the number of consumers had increased by 116, bringing the total up to 3058. There had been a substantial increase in cookers and the use of fires and other appliances. So far as the consumption of gas was concerned the Company was never so busy as during the past year, and it was gratifying to know that the demand was being maintained. Over the past ten years the gas sold had increased by 30 million c.ft. To deal with the increasing demand the Directors would have to consider in the near future the question of extending the storage capacity. The Company's principal expenditure had been in connection with the new gasholder at Instow, which was brought into use in November last, and was giving satisfaction. The income from gas was £15,293, compared with £16,693 for the previous year, the decrease being due to the reduction in price of 6d. which took place on Jan. 1, 1928. The price of gas throughout the year was 10d. per therm, or 4s. 2d. per 1000 c.ft., which was only 25 p.ct. above the pre-war level, while coal cost double what it did then, and wages, the second largest item in their balance-sheet, considerably more than double. In the course of his remarks Mr. Hunt suggested a remedy for the slippery state of the present-day bituminous roads, which, he said, were often wrongly described as tarred roads. Many experts believed the solution lay in the proper use of British tar; and roads constructed and surfaced with British tar possessed many advantages over roads made with bitumen. The report, which stated that the balance at the profit and loss (net revenue) account amounted to £7434, was adopted, and a dividend declared for the year at the rate of 13 p.ct. on the "A" shares and £9 2s. p.ct. on the "B" shares. A tribute was paid to the work of the Manager and Secretary, Mr. F. L. Schofield, and the staff.

BISHOP'S STORTFORD.

The sale of gas for the year by the Bishop's Stortford, Harlow, and Epping Gas and Electricity Company shows an increase of 3·88 p.ct. over that for the preceding year. The balances carried from the revenue accounts (gas and electricity) to the credit of the profit and loss account amount to £14,117. Adding thereto £208 received for interest, and £3192 brought forward from the preceding year, and deducting therefrom interest, income-tax, and other charges, and transferring £403 to the reserve fund, leaves £13,118 available for distribution. Interim dividends for the half-year ended June 30, 1928, were paid on Sept. 1, 1928, at the following rates: On the "A" ordinary stock, £3 4s. p.ct.; on the "B" ordinary stock, £3 p.ct.; on the "C" 5 p.ct. preference stock, £2 10s. p.ct.; and on the "D" 4 p.ct. preference stock, £2 p.ct. (all *less* income-tax); and the Directors now recommend the declaration of dividends for the half-year ended Dec. 31, 1928 (being final dividends for the year), at the following rates (all *less* income-tax): On the "A" ordinary stock, £3 11s. p.ct.; on the "B" ordinary stock, £3 5s. p.ct.; on the "C" 5 p.ct. preference stock, £2 10s. p.ct.; and on the "D" 4 p.ct. preference stock, £2 p.ct., making a total distribution for the year of £6 15s., £6 5s., £5, and £4 p.ct. respectively on the several classes of stock. These appropriations amount to £7738, and leave a balance of £5380 to the credit of the profit and loss account to be carried forward. Additional manufacturing and storage plant have been installed at the Company's Epping Works to meet the growing demand for gas in the Epping district. On Dec. 20, 1928, the Board of Trade made an Order—the Bishop's Stortford, Harlow, and Epping Gas Order, 1928—under the provisions of the Gas Regulation Act, which confers further powers upon the Company, and which prescribes a new standard price for the gas supplied—viz., 16d. per therm—in substitution for the standard price of 20d. per therm, fixed by the Company's Special Order of 1921, this reduction being made in compliance with the request of the Company.

BRENTWOOD.

The Directors of the Brentwood Gas Company submit the following report for the year ended Dec. 31, 1928. The balance carried to profit and loss account is £8461, and this amount added to the balance brought forward from last year, £3245, makes a total of £11,707. After providing for income-tax, loan interest, and other charges, there remains a balance of £8587 available for distribution. From this amount interest and dividends have been paid as follows: On the perpetual debenture stock at the rate of 5½ p.ct. per annum; on the preference stock at the rate of 5 p.ct. for the year; on the redeemable preference stock at the rate of 6 p.ct. for the year; and interim dividends at the rate of 8 p.ct. per annum on the original stock and £5 12s. p.ct. per annum on the additional stock (all *less* tax). The Directors recommend payment of final dividends (*less* tax), which, with the interim dividends already paid, will make 8 p.ct. on the original stock and £5 12s. p.ct. on the additional stock for the year. These dividends, together with the interim and preference dividends, will amount to £5301, leaving a balance of £3285 to be carried forward. During the year the Directors have raised, at par, £5000 of 5½ p.ct. perpetual debenture stock.

HARROGATE.

Presiding at the Annual Meeting of the Harrogate Gas Company on Tuesday, Feb. 19, Mr. Francis Barber, the Chairman, said that the position revealed by the accounts, he believed, they would accept as entirely satisfactory. As all the works in the area recently added to the district of supply were not closed down until Sept. 25 last, the figures could not be taken to indicate the result to be achieved from a complete year's supply of the cheaper gas from the Company's works. Turning to capital account, they would see there had been an increase in expenditure of £115,423 14s. 7d. Towards this they had raised £78,667 by the issue of £47,550 consolidated stock at a premium of £31,117. This premium brought the non-dividend paying capital in respect of consolidated stock to £34,868 1s. 2d. These were the net amounts after deducting the cost of issue. The balance in excess of receipts was increased by £27,756 6s. 2d. to a total of £92,065 3s. 4d. Last year they sold 607,881,600 c.ft., as against a total sold in the same area in 1927 of 593,608,200, showing a total increase of 14,273,400 c.ft.—2·4 p.ct. The consumption in the pre-1928 area was 519,189,100 c.ft., as against 517,328,800 in 1927—an increase of 1,860,300—0·34 p.ct. The business in the Sales Department was an easy record, with a turnover of £16,666, covering the disposal of no less than 2552 appliances—2115 in Harrogate, 52 in Nidderdale, and the remainder, 385, as stated, in the added areas. The total of the Company's area of supply now covered 193 sq. miles, and the supplies already extended to 120 sq. miles, comprising 39 parishes outside the borough of Harrogate. The total length of mains was now 153 miles, comprising 27 miles of high-pressure, and 126 miles of low-pressure mains—21½ miles of high-pressure and 7½ miles of the low-pressure were laid during the year. The gas was sent out from the works at a pressure of 8 lbs. per sq. in., and this was governed down to the needs of the districts served. In moving the adoption of the report and the recommendation of a dividend at the rate of 5 p.ct. for the last half-year (making 10 p.ct. for the year), the Chairman expressed the thanks of the Board to the Engineer and Manager (Mr. F. H. Robinson), the Secretary (Mr. A. I. Seaton), and all the other members of the staff for the efficient discharge of their duties during a very trying year. At the close of the Ordinary Meeting, an Extraordinary Meeting was held to authorize the raising of additional capital, and the following resolution was passed: That the Directors be and are hereby authorized to raise additional capital not exceeding £50,000 (in addition to the £47,491 already authorized, but not yet raised), either wholly, by the creation and issue of consolidated stock, preference stock, or debenture stock, or partly by the creation and issue of any one or more of such classes of stock in such amount or amounts and on such terms as the Directors may in their discretion determine.

HARTLEPOOL.

A few minutes was sufficient for the transaction of the business of the Annual Meeting of the Hartlepool Gas and Water Company on Feb. 21. The Directors' report and balance-sheet showed a profit for the year of £52,841, including £14,117 brought forward. After paying dividend and interest on mortgages, debentures, &c., there was a balance of £15,148 to carry forward. In moving the adoption of the report and the declaration of a dividend at the rate of 5 p.ct., the Chairman (Mr. J. Stanley Appleby) stated that, by the reduction in the price of gas, consumers had benefited to the extent of nearly £10,000 during the year. There was a reduction of £4994 in receipts from residual products. Fortunately, there had been reductions in expenditure to set-off against these reductions in income, due partly to lower prices in the chief raw materials, coal and oil, and partly to improved working results. They were anxiously awaiting the revival in local trade, which in some quarters was confidently expected, and they were well equipped for the increased demand which local prosperity would make upon them.

LIVERPOOL.

The fact that consumers of gas benefited to the extent of £129,174 last year by the reduction of price was emphasized at the Annual Meeting of the proprietors of the Liverpool Gas Company, on Feb. 19, by the Chairman (Mr. H. Wade Deacon). The Chairman said that the report and accounts of the Company for the year 1928 were satisfactory on the whole, though the markets for residual products had been disappointing. He was glad to be able to report an increase in the quantity of gas sold, in spite of the fact that the weather, especially in November and December, was much milder than in the corresponding months of 1927. They had increased the number of cookers and fires very largely during the year, and found that the demand for both was growing all the time. On the income side, the sale of gas had produced £1,187,040, which was £129,174 less than in 1927. This was entirely owing to the reduction in price, which in that year was 9d., 8·6d., and 8d. per therm, as compared with 7·8d. and 7·6d. last year. The total income shown was £1,436,900, and after deducting the expenditure there was a balance of £229,781 to carry to the credit of net revenue account. After payment of interest on debenture stock and mortgages, dividend on preference stock, and half-year's dividend on ordinary stock, there would be a balance of £175,269, subject to the final dividend for the year, to carry forward. The Chairman then moved: "That a dividend be declared for the half-year ended Dec. 31, 1928, of 3½ p.ct. on the ordinary stock of the Company, *less* income-tax." The meeting concluded with a vote of thanks to the Directors proposed by Dr. Larkin, and seconded by Mr. Jasper Moon.

MATLOCK.

The Directors of the Matlock and District Company in their annual report state that there was a profit on the past year's working of £6292, which, with the unappropriated balance for the previous year of £15,193, gives a total available sum of £21,485. Against this is charged an interim dividend amounting to £1076; debenture interest for the year £390; and bank interest £108; leaving a balance for disposal of £19,911. The Directors recommend that this shall be applied by paying a dividend of 10s. 6d. per share on the paid-up capital, making 7¾ p.ct. for the year, *less* tax, which will absorb £2260, and leave £17,651 to be carried forward. The report states that the Directors desire to bring to the notice of the shareholders that the price of gas was reduced by 6d. per 1000 c.ft. on Jan. 1, 1928, and by 2d. per 1000 c.ft. on July 1, 1928, and a further 2½d. per 1000 c.ft. will be conceded to the general body of consumers as from Jan. 1, 1929.

SCARBOROUGH.

The Annual Meeting of the Scarborough Gas Company was held at the Company's offices on Feb. 16; the Chairman, Mr. W. S. Rowntree, presiding. The Chairman, in moving the adoption of the report, said the sale of gas during the past year increased by upwards of 20 million c.ft., and the number of consumers was 178 more than a year ago. The sale and hire of appliances through the showrooms had been exceptionally good, and during the year no less than 538 cookers, 650 fires, and 387 washing coppers were fixed, as well as many other types of gas consuming appliances. The results from the introduction of the hire-purchase system showed that this innovation was being much appreciated. Owing to the continued increase in the sale of gas it was necessary to enlarge the storage capacity at the works by adding an additional lift to the existing large gasholder, provision having been made for this when the holder was erected in 1895. This work cost £3100, and the holding capacity was increased by 500,000 c.ft. For the same reason it was necessary to lay additional mains to meet the demands of consumers on the outskirts of the town. During the year 4½ miles of mains were laid or relaid, and 6¼ miles of piping used for services from the mains to the meters. The income from residuals had been rather disappointing, and is accounted for chiefly by the low market value of tar and the lower price obtained for coke. The price of gas had been reduced from 9½d. to 9d. per therm, this reduction, which was equal to 1½d. per 1000 c.ft., represented a saving to the consumers of not less than £3000 per annum. The credit balance on capital account now stood at £29,368, compared with a debit balance of £6866 the previous year. The report was duly approved. The maximum dividend of 5 p.ct. per annum was then declared. Mr. F. C. Whittaker proposed a vote of thanks to the Chairman, Directors, Manager and Secretary (Mr. A. P. Allan), and staff for their continued attention to the affairs of the Company. Mr. A. Philip Allan, replying for himself and the staff, said that all the staff continued to do their best for the welfare of the Company. The profit-sharing which might be inaugurated at that time next year had not yet been explained to the staff, but there was a lot in it that might encourage them, because it was a fact that for every £1 they could save the Company in expenses and in economy of working, they would share between them half-a-crown. This would be an incentive to even better and more economical working.

SUTTON.

The Chairman, Alderman E. J. Holland, and Directors of the Sutton Gas Company, in accordance with a custom established soon after the war, entertained a representative company to luncheon at their premises, 299, High Street, Sutton, on Monday, Feb. 18, preceding the Annual General Meeting of stockholders. After luncheon the meeting commenced, and the Chairman, in submitting the statement of accounts for the past financial year, said that during the year no less than £33,460 had been expended on capital account, a larger sum than usual. Over £20,000 of this was for new mains. In particular he mentioned the 18-in. trunk main from Cheam Road to Banstead Downs, with the object of improving the supply to the southern parts of Cheam and increasing the pressure in Banstead. Last year they sold 450 million c.ft. of gas, and added no fewer than 1023 new consumers. The Company's coal bill for the year was down by £8600. Unfortunately this favourable factor was more than offset by greatly reduced receipts from residuals, the figure being £10,200 less than last year, due to the low prices obtainable for coke and tar. The balance carried to profit and loss account was £19,067, a decrease of £4918 as compared with last year. This reduction is fully accounted for by the lower price of gas. They were again able to recommend the payment of a final dividend of 4 p.ct., making 8 p.ct., *less* income-tax, for the year on the ordinary stock. Mr. Arthur Stevens seconded the motion. On the motion of Sir Henry Maybury, seconded by Mr. Jacques, the thanks of the meeting were accorded to the Chairman, Directors, officials, and every member of the staff. A Special Meeting followed the conclusion of the business of the general meeting. The Chairman moved the following resolution: "That the draft now submitted of the Special Order for which application has been made to the Board of Trade under section 10 of the Gas Regulation Act, to authorize *inter alia* the raising of additional share and loan capital of the respective amounts stated in the Order be and the same is hereby approved subject to such alterations and additions as may be made by the Board of Trade or Parliament and approved by the Directors of the Company. Mr. J. Ferguson Bell seconded, and the resolution was unanimously carried.

SWANSEA.

Dividends at the rate of 7 p.ct. for the year on the redeemable preference stock and 5 p.ct. on the ordinary shares were declared at the Annual Meeting of the Swansea Gas Light Company, which was held at the Company's offices at Swansea. Mr. Ernest H. Leeder (Chairman) presided, and in moving the adoption of the report and statement of accounts, which showed a balance carried forward to the profit and loss account of £57,797, said the facts and figures gave evidence of a successful year's working, notwithstanding the prevalent general industrial depression. He said it was satisfactory to notice that the bank overdraft, which in 1927 was £70,790, had been reduced to £59,869. Under the Rating and Valuation Act the Company's assessment had been increased from £16,803 to £23,910, a figure which in the opinion of the Directors was quite unjustifiable, and in respect of which representations would be made. In conclusion, the Chairman said that he would like to pay tribute to the continued effort put forward by the Engineer and Manager, Mr. W. H. Johns, and by Mr. Ernest Ablett, Secretary and Assistant Engineer, and by the staff, inasmuch as he was sure that their efforts were largely responsible for the results which he had the pleasure of submitting. The report and the statement of accounts were unanimously adopted, and dividends at the rate of 7 p.ct. per annum on the redeemable preference stock, and at the rate of 5 p.ct. per annum on the ordinary stock, were declared.

TUNBRIDGE WELLS.

The Directors of the Tunbridge Wells Gas Company submit the following report for the year ended Dec. 31, 1928. The accounts show that after deducting the interim dividend at the rates of 13½ p.ct. per annum on the consolidated "ordinary" stock, 11 p.ct. per annum on the consolidated "B" stock, and 10½ p.ct. per annum on the consolidated "C" and "D" stocks, providing for all fixed charges, and carrying £5000 to the suspense account to meet extraordinary renewals, there remains for division a balance of £20,371, and the Directors recommend that dividends be declared for the half-year to Dec. 31 at the rates of 14 p.ct., 11½ p.ct., and 11 p.ct. per annum on the respective stocks (*less* income-tax), leaving a balance of £14,636 to be carried forward to the next account. The price of gas was reduced by two-fifths of a penny per therm from the end of the March quarter, and the price now is 9d. per therm. The demand for gas has been well maintained, showing a satisfactory increase notwithstanding the very mild weather during the latter part of the year. A large number of gas appliances have been sold and hired during the period under review. It is satisfactory to report that the Company's application to the Board of Trade for a Special Order to acquire the undertaking of the Crowborough District Gas Company, extend their area, to confer further powers upon the Company, for conversion of the existing stocks, and other purposes, has passed through its initial stages, and it is anticipated that these powers will soon become operative. In view of the Company's extended area, and the necessity for capital expenditure, an opportunity will be afforded the stockholders of acquiring a sound and profitable investment by the issue of stock, further particulars of which will be given in due course.

COLD WEATHER AND GAS ACCOUNTS.

The Wandsworth, Wimbledon, and Epsom District Gas Company have sent the following notice to all their ordinary consumers:

Arising from the abnormally cold weather recently experienced, there has been a correspondingly large increase in the use of gas—in fact, so great was the demand during this period that for many days the output of gas approximated 40 p.ct. more than at any other time in the Company's history. The Company are pleased that they have been able to meet this exceptional call from their consumers, but would remind them that this larger use of gas will entail an increase in the gas accounts.

In order to guide and assist the consumers, the Company will—on receipt of the enclosed postcard—send to read the index of the meter, and render the account up to the date of this special meter reading. This account will be for the amount of gas consumed only. The charges for meter and stove hire, &c., will be rendered as usual at the end of the quarter. The object of this special provision is to be of service to any consumers who may wish to know their consumption up to date. This special account may be paid forthwith, or treated as a record of the gas consumed.

Doubtless, a few of the consumers have experienced difficulties with their supply of gas; but this impoverishment has been in isolated and individual cases, caused through the severity of the weather, and, though much regretted, it was entirely due to circumstances over which the Company had no control.

C. M. Croft,
General Manager.

FURTHER CAPITAL FOR CONTINUOUS COAL CARBONIZATION, LTD.

The Directors of Continuous Coal Carbonization, Ltd., in their report for 1928, state that the Company have, during the past year, developed and improved the site acquired at Erith. A great deal of research work has been undertaken, and some hundreds of samples of various fuels have been tested by the Company's process, and satisfactory results have been obtained in regard to gas, fuel, and residual oils. The Company are laying down forthwith at the Erith Works a continuous carbonizing unit of the straight-line type of considerable capacity, which installation will be completed within some three or four months' time. An identity of interests and an agreement has been come to with the Incandescent Heat Company, Ltd., of Birmingham.

The first ordinary general meeting of Continuous Coal Carbonization, Ltd., was held in London on Monday last, when the following resolution was submitted:

> That the capital of the Company be increased to £157,500 by the creation of 200,000 "A" shares of 5s. each and 50,000 "B" shares of 1s. each, ranking respectively for dividend and in all other respects *pari passu* with the existing "A" shares and "B" shares in the capital of the Company.

The new shares are to be allotted in payment of the sole licence in respect of a number of British and foreign patents which have been acquired by the Company from the Incandescent Heat Company.

LEEDS GAS DEPARTMENT ESTIMATES.

The Finance Committee of the Leeds City Council met on Feb. 27 to consider the estimates of the various departments preparatory to the submission of the annual "budget." On the past year's working the Gas Department showed a deficit of £9990, as compared with an estimated surplus of £3310. Moreover, for the coming year the Committee are budgeting for a further deficit of £12,060. It is considered that the restricted sale of gas is due partly to the wide adoption of the assisted electricity wiring scheme, and partly to the abnormally mild weather experienced until a month ago.

The sale of gas realized £26,910 less than was expected, and there was less revenue from some of the residual products. Instead of an estimated revenue of £74,400 from coke, sales amounted to £64,020; and the revenue from tar, which was expected to be £35,000, proved to be only £30,230. On the other hand, the sale of benzole has yielded £14,610, as against an expected £9000. Of a gross profit of £178,980, loan charges amounting to £156,830 have to be met. There is, therefore, no hope of a reduction in the price of gas during the present year. The street lighting department report a saving as compared with the original estimate of £685.

CONTRACTS OPEN.

Engine and Exhauster and Compressor.

The Gas Department of the City of Bradford invite tenders for the supply and erection of a steam engine and exhauster and three compressors. [See advert. on p. 692.]

Tar and Ammoniacal Liquor.

The Padiham Urban District Council invite tenders for the purchase and removal of the surplus tar and ammoniacal liquor from their gas-works. [See advert. on p. 692.]

TRADE NOTES.

The Coventry Chain Company, Ltd.

The Coventry Chain Company, Ltd., of Spon End Works, Coventry, have published two booklets on their various types of chains. A complete range of standard drives up to 75 H.P. is given, and the list contains full technical data to enable a satisfactory selection of any combination within the range of ratios offered. Chain gearing in all its various applications is compact, durable, and has a maintained efficiency of 98 p.ct., and as such is worthy of consideration in any problems of power transmission.

Woodall-Duckham Vertical Retorts for Tredegar and Turin.

The Woodall-Duckham Vertical Retort and Oven Construction Company (1920), Ltd., have received an order from the Tredegar Gas and Water Department for an installation of Woodall-Duckham Continuous Vertical Retorts having a daily making capacity of about 430,000 c.ft. The new plant will consist of six 53-in. retorts, and the contract includes new retort house, coke and coal handling plant, waste-heat boiler, and all necessary foundations. In addition, the Compagnie Générale de Construction de Fours have received an order to build an installation of Woodall-Duckham Continuous Vertical Retorts at Turin for the Societa Torinese Industrie Gas E Electtricita. The plant will have a carbonizing capacity of 252 tons per day.

Aluminium Bronze.

The British Aluminium Company, Ltd., of Adelaide House, King William Street, E.C. 4, have published an interesting little booklet on the subject of aluminium bronze. The production is divided into eight sections, and the various subjects dealt with in connection with aluminium bronze include chapters on foundry technique, influence of other metals, heat treatment, notes on die-casting, besides a compilation of tables and appendices at the end. Aluminium bronze is an attractive art metal the colour of 10-carat gold, which will take very beautiful oxidized finishes. At its simplest, the metal is an alloy of 90 p.ct. copper with 10 p.ct. aluminium, and hundreds of tons annually go to the making of acid resisting chemical plant, while the addition of small percentages of other metals such as iron, nickel, manganese, or lead confers still further valuable physical or foundry properties, opening up fields of utility in the most widely divided spheres of industry.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

London, *March 4.*

There is very little change to report in the market for tar products. The price of pitch is generally supposed to have reached such a low level that in some cases higher prices are being indicated for next season's delivery.

Creosote for shipment to America is about 6¾d. per gallon f.o.b., and quite a number of shipments are taking place.

The prices of most white spirits rose in sympathy with the increase in the price of petrol.

Pure benzole is about 1s. 11d. to 2s. per gallon, and pure toluole 2s. 1d. to 2s. 2d. per gallon.

Tar Products in the Provinces.

March 4.

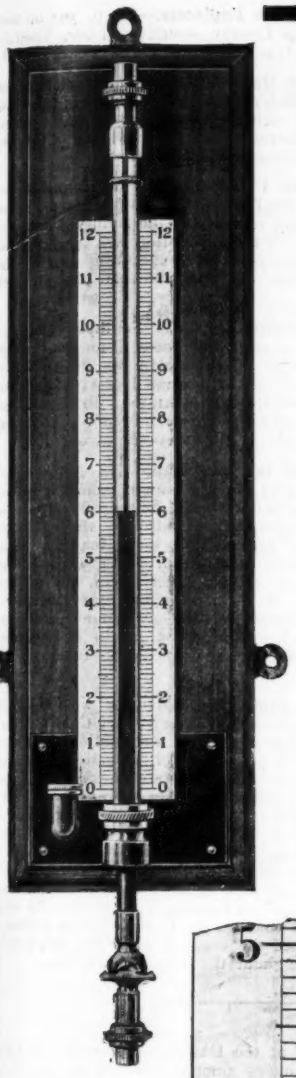
The average prices of gas-works products during the week were: Gas-works tar, 18s. 6d. to 23s. 6d. Pitch—East Coast, 32s. to 33s. f.o.b. West Coast—Manchester, 27s. to 27s. 6d.; Liverpool, 29s. to 30s.; Clyde, 29s. to 30s. Toluole, naked, North, 1s. 7½d. to 1s. 8½d. Coal-tar crude naphtha, in bulk, North, 9d. to 10d. Solvent naphtha, naked, North, 1s. 3¾d. to 1s. 4¼d. Heavy naphtha, North, 1s. to 1s. 0¾d. Creosote, in bulk, North, liquid, 4d. to 4¼d.; salty, 3¾d. to 4d.; Scotland, 4d. to 4¼d. Heavy oils, in bulk, North, 6d. to 6¼d. Carbolic acid, 60 p.ct., 1s. 10d. to 1s. 10½d. prompt. Naphthalene, £13 to £15; salts, £5 to £5 10s., bags included. Anthracene, "A" quality, 2½d. per minimum 40 p.ct., purely nominal; "B" quality, unsaleable.

Benzole Prices.

The following are considered to be the market prices to-day:

	s. d.	s. d.	
Crude benzole . . .	1 0	to 1 1	per gallon at works
Motor ,, . . .	1 7	,, 1 8	,, ,, ,,
90 p.ct. ,, . . .	1 9	,, 1 10	,, ,, ,,
Pure ,, . . .	2 0	,, 2 1	,, ,, ,,

Gas and Electricity During the Frost.—The following is an extract from a local paper referring to recent events brought about by the weather conditions in Slough: "The events of last week at the 'Dolphin' seem to have been a victory for gas in the 'Gas v. Electricity' tournament. I hear that when the central heating system went wrong, and the Slough traders looked like having to dine among icicles, the Electric Light Company said it was impossible to do anything about it in time, but the Gas Company buckled in and did a week's work in a day-and-a-half. Sequel (according to newspaper testimony)—the 'Rotunda' was the cosiest place in the whole of shivering Slough."

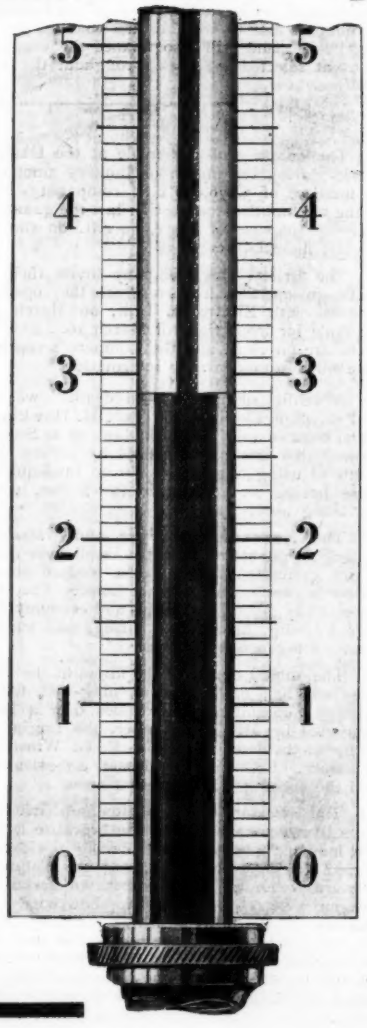


WRIGHT'S WESTMINSTER

SINGLE TUBE GAUGE

ALL-BRITISH.

Below—Full-Size Scale and Tube.



SINGLE GAUGES OR BATTERIES:

POLISHED WOOD OR IRON BACK.

ALEXANDER WRIGHT & CO., LTD. WESTMINSTER, S.W. 1

COAL TRADE REPORTS.

From Our Own Correspondents.

NORTH-EAST COAST.

The demand for almost all classes of coal is as insistent as ever, and an increasing output is being disposed of without difficulty. The further spell of cold weather has increased transport difficulties from the Continental coalfields, and both Scandinavia and the Mediterranean ports are keen buyers of English coal. Much shipping is held up by ice, and the shortage of boats is the chief difficulty with which the Tyne is faced. But good business is being done, and there is little free coal available for this month, while good prices are being obtained for April. Apart from the extra rush due to weather conditions, the trade claims to see a distinct improvement in the demand which is due to normal requirements. A continuance of this would naturally be of far greater benefit than an abnormal period of high prices like the present, which is of benefit only in so far as collieries had not sold their output ahead.

Gas coals, while enjoying good steady trade, are not enjoying any abnormal demand. Wear Specials continue to quote round 15s. 6d. f.o.b., and best qualities 15s. to 15s. 3d. Seconds now ask 14s. 9d. to as much as 15s. 3d. for some of the best sorts. Coking is still in strong demand at 14s. 9d. to 15s. 3d., and collieries are holding out for these prices for April shipment. Durham unscreened steams are scarce, and best bunker qualities hold for 15s. 6d. f.o.b.; seconds quoting 14s. 6d. to 15s. 3d. Northumberland steams are very strong, and best screened sorts easily get 16s. 6d. for any available spot lots.

A keen demand for gas coke continues, and the higher prices of 21s. to 22s. f.o.b. are maintained.

YORKSHIRE AND LANCASHIRE.

The demand for all classes of coal has greatly increased during the past week, with the result that it is difficult to obtain immediate delivery of any of them. Collieries are working practically full time. This greater activity is not merely the outcome of the exceptionally severe weather, but indicates an improvement in the coal trade generally. This applies particularly in regard to export, and buyers are now seeking to cover their requirements for from three to six months ahead, while collieries continue their firmer attitude in regard to values. The home consumption of large steam coal has improved.

The following are the Humber bunker and export prices, f.o.b. usual shipping ports:

South Yorkshire—Hards, Association, bunkers 21s. 9d., export 19s. to 20s.; screened gas coal, export 18s.; washed trebles, export 19s.; washed doubles, bunkers 19s. 9d., export 18s. 6d.; washed singles, export 17s.; washed smalls, bunkers 15s. 9d., export 13s.; rough slack, bunkers, 14s.. export 12s.; smithy peas, export 18s. to 18s. 6d.

West Yorkshire—Hartley's (f.o.b. Goole), bunkers 18s. 9d., export 17s. 6d.; screened gas coal, export 17s. 6d.; washed trebles, export 18s.; washed doubles, export 17s. 6d.; washed singles, export 16s.; washed smalls, bunkers 14s. 9d., export 12s. 6d.; unwashed trebles, export 17s.; unwashed doubles, export 14s. 6d.; rough slack, bunkers 14s., export 10s.; coking smalls, export 10s. 6d.

Derbyshire and Nottinghamshire—Cobbles, export 18s. to 19s.; washed trebles, export 18s. 6d.; washed doubles, export 17s. 6d.; washed singles, export 16s. 6d.; washed smalls, bunkers 15s. 3d., export 12s. 6d.; unwashed doubles, export 16s.; rough slack, bunkers 14s., export 11s. 6d. to 12s.

Yorkshire, Derbyshire, and Nottinghamshire—Screened steam coal, bunkers 19s. to 20s., export 16s. to 18s.; gas coke, export 20s. to 24s.; furnace coke, export 20s. 6d. to 21s. 6d.; washed steam (Goole, West Yorks.), 18s. 6d.. (Hull, West Yorks.), 19s., (Hull, South Yorks.), bunkers 19s. 3d., export 17s. 6d.

The following are the average prices in wagons at the pit in Lancashire: Washed doubles, 14s. to 15s.; washed singles, 13s. 3d. to 14s. 3d.; rough slack, 9s. to 10s. per ton.

MIDLANDS.

Demand throughout the Midland area for all descriptions of coal is extremely brisk, but business is beset with many difficulties. Collieries within the marketing scheme are working on an increased allotment, those outside are going full tilt, and all are at their wits' end to keep customers supplied. The trouble only begins when wagons are loaded at the collieries. They are held up on the railways for many days before they reach distributors, and the latter are greatly in arrear with deliveries. A great shortage of wagons is created in consequence, and the extra time worked at the collieries is to a large extent nullified. All the time the demand for house coal is enormous. Extra traffic is thrown on the railways by reason of the disorganization of canal traffic by the long spell of frost.

Values for best and secondary coal are extremely firm, and seem to vary with the position at the individual collieries. In some cases about 1s. per ton extra is being obtained where fairly prompt supplies can be given, but there is no uniformity. As it happens, instances are rare where prompt supplies are available. Though demand for D.S. nuts and slacks is maintained at a high level, supplies seem to be fairly adequate; at any rate, no actual shortage is reported. Values are decidedly firm, and a full trade is assured for some little time to come. Warwickshire collieries are doing a substantial trade in bakers' nuts for the London market.

New Plant for Shipley.—The Shipley District Council have approved a recommendation of the Gas Committee to instal new plant at a cost of £24,338; and application is to be made to the Ministry of Health for sanction to borrow £26,000 for the purpose.

Gas Light and Coke Company.—The Bill promoted by the Gas Light and Coke Company, against which twelve petitions had been presented, will now pass unopposed through the House of Commons; a settlement having been effected with the opposing interests. The object of this Bill is to absorb the undertakings of the Grays and Tilbury Company and the Pinner Gas Company.

Rugby Stock Issue.—As will be seen from the announcement appearing in our advertisement pages, Messrs. A. & W. Richards, of 37, Walbrook, E.C., are offering for sale by tender £25,000 5½ p.ct. perpetual debenture stock of the Rugby Gas Company at a minimum price of issue of par. A deposit of £10 per £100 must accompany a tender, and the balance of the purchase-money is to be paid on March 30.

Metropolitan Gas Company of Melbourne.—The report of the Directors of the Metropolitan Gas Company of Melbourne for the half-year ended Dec. 31, 1928, shows that the profits amount to £121,456. The Directors have transferred to capital account the sum of £25,562, and propose to pay a dividend at the rate of 7s. 6d. per share, which will absorb £97,500, and leave a total of £61,260 to be carried forward to the next account.

Price Reduction at South Shields.—The Directors of the South Shields Gas Company announce that, as from the March quarter meter readings, the price of gas will be reduced by ¼d. per therm, making the price 9d. per therm for the inside area consumption, and 9·8d. per therm for supplies in the Company's outside area districts. Consequent upon the above reductions, a relative additional rebate will also be given to prepayment consumers as from and including the collections commencing on April 1 next.

Amalgamation of Dudley and Brierley Hill.—In connection with the proposed amalgamation of the Dudley and Brierley Hill gas undertakings (see "JOURNAL" for Feb. 27, p. 616), a meeting of the shareholders of the Town of Dudley Gas Light Company was held on Feb. 27, at the conclusion of the Annual General Meeting, when the resolution was adopted—subject to the granting of the necessary Order by the Board of Trade—confirming a provisional agreement for the amalgamation of that undertaking and the Brierley Hill District Gas Light Company. It is anticipated that the arrangement will become fully operative during next autumn, and each of the works will continue to manufacture and distribute gas, so there will be no reduction in the number of employees.

Chester Co-Partnership Report.—The Co-Partnership Committee of the Chester United Gas Company presents the following report for the year 1928. A sum of £1415 17s. 1d. has been allocated by the Directors to the co-partnership fund. This amount will be credited to the accounts of the co-partner employees at 6¼ p.ct. on salaries or wages, the same rate as the past few years. The number participating in the bonus is 141. Company's ordinary stock to the amount of £830 has been purchased by co-partners during the year, and there are now 113 who have an investment in the Company's stock. Withdrawals are still high, and the Committee again emphasizes the fact that the strength and usefulness of the scheme is in the degree that bonuses are allowed to accumulate or permanent benefit is obtained from regular investment in stock. The general meeting will be held in the Recreation Room at the Roodee Works on Monday, March 4.

Institution of Chemical Engineers.—Announcement is made of the programme of the Seventh Annual Corporate Meeting of the Institution of Chemical Engineers. While less ambitious in scope than on some previous occasions, there is no doubt of the interest that will be aroused by the subjects considered. The meeting will occupy the whole of Wednesday, March 20, and will be held at Grosvenor House, Park Lane, W. 1, under the chairmanship of the President, Sir Alexander Gibb. The proceedings open at 11.30 a.m. with the business session, to which only members of the Institution are admitted. Non-members are, however, invited to attend the delivery of Sir Alexander Gibb's address, which follows at 12.15 p.m. After lunch, Prof. B. P. Haigh, of the Royal Naval College, Greenwich, will read a paper on "Chemical Action in Relation to Fatigue in Metals." The meeting closes with the annual dinner in the evening; this being the last function before Sir Alexander Gibb vacates the office of President.

European Gas Company, Ltd.—In the report of the Directors for the year ended Dec. 31, 1928, which will be submitted at the general meeting on Tuesday next, it is stated that, after providing for all charges, the profit on the year's operations amounts to £61,205 0s. 10d. An interim dividend at the rate of 4s. per share was paid in October last, absorbing £20,043 12s. The Directors now recommend that a final dividend of 7s. per share be paid, making a total of 11s. per share, or 5½ p.ct., for the year, free of income-tax, and that the balance of £6085 2s. 10d. be carried to general revenue. In the month of June the franc was officially stabilized at a figure corresponding to an exchange value of 124.21 francs to the pound sterling—that is to say, the approximate rate at which the franc had stood since December, 1926. Conditions of trade and industry in France during the year were prosperous, and the quantity of gas sold shows an increase of 4·77 p.ct. The number of consumers has at the same time risen from 147,169 to 149,719, an increase of 2550 in the year, or at the rate of 1·73 p.ct. For the first time since the war, the percentage of unaccounted-for gas shows a material decrease as a result of the work of repair and replacement of defective mains; this work is still being steadily continued. The erection of the gasholder at Nantes, on the site of the new works at Roche Maurice, was completed, and the auxiliary plant on the Strache system was put into operation. A contract was concluded for the supply of gas until Dec. 31, 1978, to Bouguenais, an outlying commune of Nantes. At Caen a new bench of retorts was completed and put into action. Plant for the extraction of benzole was erected and put into action at Boulogne and at Havre.

Corrigendum, Institution of Gas Engineers.—On p. 592 of last week's "JOURNAL" Mr. Thomas Cranby should read Mr. Thomas Crowdy, Engineer and Manager, Gas and Water Department, Kendal.

Public Lighting Contract for Deal.—At the monthly meeting of the Deal Town Council on Tuesday, Feb. 26, a new contract for public lighting was entered into with the Gas Company for a period of five years. By a five-year contract, the saving will be £165 per annum as compared with the three-year contract.

New Mains in Lurgan.—The Ulster Ministry of Home Affairs have refused the application of the Lurgan Urban Council for sanction to a loan of £4000 for making repairs and the laying of new gas mains in the town, stating that, as the application was in respect of a trading undertaking and for the purpose of executing repairs, the Council should borrow from some other source than the Ministry of Finance.

Southport Retorts to be Reconstructed.—The Southport Corporation Gas Committee have recommended the Town Council to accept a report of the Gas Engineer (Mr. John Bond), and instruct him to carry out the necessary work (at an estimated cost of £16,000) of reconstructing two of the vertical retort settings. Mr. Bond had reported that five settings of vertical retorts required renewal, and suggested that two settings should be reconstructed at once.

Belfast Gas Department and the City Hall.—The Belfast Corporation's practice of devoting £11,000 per annum from the profits of the gas undertaking to meet interest and sinking fund charges on the City Hall was again vigorously assailed on the Council's budget day; but the grant was passed by a large majority. The argument by those taking exception was that the gas consumers were entitled to the benefits in the way of lower prices, and not the ratepayers in general, as some of these were not gas consumers. Defending the practice, the Chairman of the Gas Committee (Councillor M'Laurin) pointed to the low charge for gas in Belfast, and said that in any event the gas offices occupied one-eighth of the space of the City Hall.

Parent Coal Carbonisation Trust, Ltd.—Mention was made in our last issue (p. 622) of the registration of the Parent Coal Carbonisation Trust, Ltd., as a public Company with a capital of £750,000. The subscription list was opened yesterday for an issue at par of 1,200,000 8 p.ct. cumulative participating preference shares of 10s. each and a similar number of deferred ordinary shares of 1s. each. The Company is acquiring a process of low-temperature carbonization of coal, which was evolved in Germany during the war by Mr. Alfred Aicher, formerly Chief Engineer of the constructional department of the Thyssen Works, at Mulheim, in the Ruhr. The prospectus contains a statement showing results obtained from the operation of units in Germany. The Company is to erect its own installation and to treat cannel coal at the Campbelltown Colliery, Argyllshire, and will also finance the erection of plants and rotary ovens at selected collieries throughout the United Kingdom.

The quantity of gas made at the Darlington Corporation Gas-Works during the month of January amounted to 70,925,000 c.ft.—an increase of 3,676,000 c.ft. compared with January of last year. In the ten months from April 1 last the quantity made was 537,964,000 c.ft.—an increase of 1,471,000 c.ft. on the corresponding period of the last financial year.

The Bristol Gas Company invite their consumers to visit the model gas-operated kitchen which they opened for inspection in conjunction with Electrolux, Ltd., on March 4. The exhibit will be available for inspection till March 16. New all-enamelled gas appliances are on view, and the Company's representatives are in attendance all day to give any information.

A verdict of "Accidental death" was returned at the inquest on Feb. 28 on Detective-Sergeant H. Hawkins and his wife, who were found dead in their house on Jan. 30 at Stoke Newington. Evidence showed that death was caused by carbon monoxide poisoning as a result of using a gas stove in an inadequately ventilated room, the stove having an attachment for a flue, which, unfortunately, was not being used.

The Newcastle-upon-Tyne and Gateshead Gas Company are issuing an attractive pamphlet to all their quarterly customers during March giving an insight to the modern housewife of the many uses to which gas can be put in the home. The cleanliness, smokelessness, adaptability, speed, certainty, and economy of gas for cooking, heating, washing, drying and airing, and ironing, as well as for hot water, are concisely treated.

The annual dinner of the fitters of the Wolverhampton Gas Company was held on Monday evening last, when Mr. A. Coombes, the Fittings Superintendent, presided over a large gathering. He was supported by Mr. A. Cranmer, the Engineer. As a mark of sympathy to the late Chief, Mr. P. G. Winstanley, the members stood in silence. Following the dinner, a musical entertainment was given, and the evening was a great success.

The Directors of the Cheltenham Gas Light and Coke Company have issued an attractive little brochure dealing with the growth of the industry in Cheltenham during the past decade. There are included excellent photographs of the Company's Central Office and Lecture Room in North Street, an aerial view of the works, and interior views of the branch showroom. Included also are some interesting statistics concerning the progress of the undertaking during the last ten years in regard to the amount of gas sold, the meters in use, the steady decrease in the prices charged for gas during that period, together with some figures relating to the number of appliances and fittings sold in each year.

STOCK AND SHARE LIST.

[For Stock Market Report, see earlier pages.]

Issue.	Share.	When ex-Dividend.	Dividends. Prev. Hf.Yr	Dividends. Last Hf. Yr.	NAME	Quotations. Mar. 1.	Rise or Fall on Week.	Transactions Lowest and Highest Prices.
£			%p.a	% p.a.				
171,978	Stk.	Feb. 7	5	5	Aldershot 5 p.c. max. C.	70–75	..	..
412,992	,,	,,	4	4	Do. 4 p.c. Pref.	73–76	..	..
1,551,868	,,	Sept. 27	7	7½	Alliance & Dublin Ord.	99–102	..	100½–101½
374,000	,,	Jan. 10	4	4	Do. 4 p.c. Deb.	63–66	..	..
522,655	,,	Aug. 30	7	7	Barnet Ord. 7 p.c.	114–117	..	..
300,000	1	Oct. 11	1/7½	1/8½	Bombay, Ltd.	20/–22/-	..	..
172,500	10	Aug. 30	8½	8½	Bournemoush 5 p.c.	13–13½	+½	13¼
600,050	10	,,	7	7	Do. B 7 p.c.	12½–13	..	..
439,160	10	,,	6	6	Do. Pref. 6 p.c.	11–11½	..	..
50,000	Stk.	Jan. 10	3	3	Do. 3 p.c. Deb.	55–58	..	..
162,025	,,	,,	4	4	Do. 4 p.c. Deb.	74–77	..	75–76
357,900	,,	Aug. 30	7½	7½	Brighton & Hove 6 p.c. Con.	115–118	..	..
371,880	,,	,,	6½	6½	Do. 5 p.c. Con.	101–104	..	..
1,267,500	,,	Feb. 21	5	5	Bristol 5 p.c. max.	90½–91a*	–1½	..
885,000	,,	Sept. 27	7	8	British Ord.	117–120	..	..
100,000	,,	Dec. 20	7	7	Do. 7 p.c. Pref.	115–120	..	..
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb.	73–76	..	..
200,000	,,	,,	5	5	Do. 5 p.c. Red. Deb.	93–96	..	..
100,000	10	Dec. 6	8	8	Cape Town, Ltd.	8–9	..	..
100,000	10	Oct. 25	4½	4½	Do. 4½ p.c. Pref.	6¾–7½	..	..
150,000	Stk.	Dec. 20	4½	4½	Do. 4½ p.c. Deb.	73–78	..	..
626,860	,,	Feb. 21	6	6	Cardiff Con. Ord.	97–100*	+2	..
287,860	,,	Jan. 10	7½	7½	Do. 7½ p.c. Red. Deb.	100–103	+2	102½–103
157,150	,,	Feb. 21	5	6½	Chester 5 p.c. Ord.	87½–92½*	..	..
79,185	1	Oct. 11	12/-	12/-	Colombo Ltd. Ord.	36/–38/-	..	..
24,495	1	,,	1/4½	1/4½	Do. 7 p.c. Pref.	21/–23/-	..	..
376,402	1	Oct. 11	1/9½	1/9½	Colonial Gas Assn. Ld. Ord.	24/6–26/6	..	26/-
187,848	1	,,	1/7½	1/7½	Do. 8 p.c. Pref	21/–23/-	..	..
2,073,280	Stk.	Feb. 21	6	7	Commercial Ord.	98–101*	+1	98–99½
475,000	,,	Dec. 20	8	8	Do 8 p.c. Deb.	56–59	..	..
800,000	,,	Sept. 27	11	11	Continental Union, Ltd.	120–130	–5	118–128½
200,000	,,	,,	7	7	Do. 7 p.c. Pref.	120–130	–5	..
787,560	,,	Feb. 21	7	7	Croydon sliding scale	109–112*	..	..
403,100	,,	,,	5	5	Do. max. div.	82–85*	..	..
542,270	,,	Aug. 16	10	7	Derby Con.	115–120c	..	..
55,000	,,	Dec. 20	4	4	Do. Deb.	70–72c	..	..
909,000	,,	Aug. 30	5	5	East Hull Ord. 5 p.c.	75–78	..	..
1,002,180	10	Sept. 13	16	14	European, Ltd.	17½ 19½	–½	..
18,703,480	Stk.	Feb. 21	5½	5½	Gas Light & Coke 4 p.c. Ord.	19/–19/6f*	–1½	19/–19/9
2,600,000	,,	,,	8½	8½	Do. 8½ p.c max.	64–66*	..	64½–65½
4,157,020	,,	,,	4	4	Do. 4 p.c. Con. Pref.	77–80*	..	77½
5,602,620	,,	Dec. 20	8	8	Do. 8 p.c. Con. Deb.	58–61	..	59½–60½
3,642,770	,,	,,	5	5	Do. 5 p.c. Red. Deb.	98–101	..	101½–101¾
82,500	,,	Aug. 30	6½	7	Hastings & St L. 5 p.c. Conv	95–100	..	..
258,740	,,	,,	5½	5½	Do. 5½ p.c. Conv.	75–80	..	..
70,000	10	Oct. 11	110	110	Hongkong & China, Ltd.	13–14	..	..
213,200	Stk.	Aug. 30	5	5½	Hornsey Con. 5½ p.c.	88–91	..	..
1,976,000	,,	Nov. 8	10	10	Imperial Continental Cap.	385–405	–25	370–423
228,180	,,	Feb. 7	8½	8½	Do. 8½ p.c. Red. Deb.	69–72	..	..
235,242	,,	Aug. 16	7	7½	Lea Bridge 5 p.c. Ord.	120–123	..	..
2,145,907	,,	Feb. 21	6½	6½	Liverpool 5 p.c. Ord.	93½–94b*	+¾	..
600,000	,,	Sept 27	7	7	Do. 7 p.c. Red. Pref.	101–103b	..	..
165,786	,,	Feb. 21	9	8	Maidstone 5 p.c. Cap.	121–126*	..	..
63,480	,,	Dec. 20	3	3	Do. 3 p.c. Deb.	54–57	..	..
75,000	5	Dec. 6	18	18	Malta & Mediterranean	5¾–6½	..	5¾
392,000	—	—	—	—	Metrop't'n (of Melbourne) 5½ p.c. Red. Deb.	100–102	..	..
641,920	Stk	Nov. 22	17	15	Montevideo, Ltd.	99–102	+2	..
2,061,315	,,	Feb. 21	5	5	Newcastle & Gateshead Con.	16/9–17/3d*	–/1½	..
682,856	,,	,,	4	4	Do. 4 p.c. Pref.	72½–73½d*	–1½	..
691,705	,,	Dec. 20	8¼	8¼	Do. 8½ p.c. Deb.	68–69d	..	..
131,780	,,	Aug 30	6/18/0	7/1.0	North Middlesex 6 p.c. Con	102–107	..	..
800,000	,,	Nov. 22	7	9	Oriental, Ltd.	116–120	..	117½
188,120	,,	Dec. 20	7½	8	Plym'th & Stonhouse 5 p.c.	108–111	..	..
424,416	,,	F b. 21	7½	8½	Portsm'th Con. Stk. 4p.c. Std	113–118*	..	114
241,446	,,	e ,,	5	5	Do. 5 p.c. max	81–84*	..	82
2,334,464	1	—	—	—	Primitiva Ord.	32/6–34/6	–3 6	31/–37/9
214,500	100	Dec. 3	4	4	Do. 4 p.c. Red. Deb.	91–94	..	..
695,000	Stk.	Jan. 24	4	4	Do. 4 p.c. Red. Deb. 1911	78–80	..	79½
416,345	,,	Dec. 20	4	4	Do. 4 p.c. Cons. Deb.	78–80	..	79½
150,000	10	Sept 27	6	6	San Paulo 6 p.c. Pref.	8⅞ 8⅞	..	114
1,736,968	Stk	Aug. 30	—	—	Sheffield Cons.	106–108s	+1	..
95,000	,,	Jan 10	—	—	Do. 4 p.c. Deb.	74–77e	..	..
90,000	10	June 14	13	14	South African	4–6	..	..
6,609,895	Stk.	Feb. 21	5	7½	South Met. Ord.	106 108*	..	103½–107½
500,000	,,	,,	6	6	Do. 6 p.c. Irred. Pf.	108–111*	..	110
1,895,446	,,	Jan. 10	8	8	Do. 3 p.c. Deb.	59–61	..	60¼
784,000	,,	Sept 13	6½	6½	Do. 6½ p.c. Red. Db.	101–103	..	101½
91,500	,,	Aug. 16	8½	8½	South Shields Con.	109–110d	..	..
1,543 795	,,	Feb. 21	6½	6½	South Suburban Ord. 5 p.c.	107–110*	..	107–109
468,837	,,	Dec. 20	5	5	Do. 5 p.c. Deb.	98–101	..	..
647,740	,,	Aug. 30	5	5	South'mpton Ord. 5 p.c. max	78–80	..	78½–79½
121,278	,,	Dec. 20	4	4	Do. 4 p.c. Deb.	72–75	..	73–74
350,000	,,	Feb. 21	7	7	Swansea 7 p.c. Red. Pref.	100–102*	+1	..
200,000	,,	Dec. 20	6½	6½	Do. 6½ p.c. Red. Deb.	100–102	+1	..
1,002,275	,,	—	—	—	Tottenham District Ord.	102–105	..	103½–104½
150,000	,,	July 29	5½	5½	Do. 5½ p.c. Pref.	97–100	..	..
181,955	,,	Dec. 6	4	4	Do. 4 p.c. Deb.	75–78	..	..
289,094	,,	Aug 30	6¾	6¾	Uxbridge, Maidenhead, & Wycombe 5 p.c.	95–100	..	..
88,880	,,	,,	5	5	Do. 5 p.c. pref.	87–92	..	..
30,000	,,	Feb. 21	8½	9	Wandsworth, Wimbledon, and Epsom— Wandsworth A 5 p.c.	147–152*	..	..
356,636	,,	,,	7½	7½	Do. B 5½ p.c.	125–130*	..	125–127
432,535	,,	,,	6½	6½	Do. C and New	102–107*	..	105
362,000	,,	,,	7½	7½	Do. Wimbledon 5 p.c.	115–120*	..	..
98 000	,,	,,	7½	7½	Do. Epsom 5 p.c.	125–130*	..	..
200,000	,,	,,	5	5	Do. 5 p.c. Pref	90–95*	..	..
88 416	,,	Dec. 20	3	3	Do. 3 p.c. Deb.	57–60	..	..
284,748	,,	,,	4	4	Do. 4 p.c. Deb.	77–80	..	..
207,500	,,	,,	5	5	Do. 5 p.c. Deb.	97–100	..	..

Quotations at:—*a.*—Bristol. *b.*—Liverpool. *c.*—Nottingham. *d.*—Newcastle. *s.*—Sheffield. *f.*—The quotation is per £1 of Stock. * Ex. div. † Paid free of income-tax. ‡ For year.

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CONTENTS.

EDITORIAL NOTES.

Past, Present, and Future 721
Halifax and the Two-Part Tariff 721
The Rate Structure Problem 722
Complete Gasification 723
Big Consumptions—And Small Consumptions—The Technical Press—Universality of Heat—Waste Not 723
The Gas Section—Municipal Trading . . 724

Forthcoming Engagements 724
Area Gas Supply Committee—Dr. E. W. Smith's Appointment 724
Society of British Gas Industries—Meeting of Council 724
World Power Conference—Barcelona Sectional Meeting 724
Personal 725
Obituary—
Walter Fendick 725
On the Electrical Side 725
Gas Stock and Share Market 726
Complete Gasification — Humphreys and Glasgow Combination Plant 727
New Offices for the Gas Light and Coke Company—Imposing Premises at Kensal Green 729
Welfare Work at Beckton—Opening of the New Ambulance Building 730
Midland Association of Gas Engineers and Managers—
General Business 732
Are Our Manufacturing Methods Progressing? 733
Presidential Address of Mr. C. M. D. Belton 738
Manchester District Institution of Gas Engineers—
Presidential Address of Mr. W. B. McLusky 734
Midland Junior Gas Association—
Perfecting Modern Gas Ovens. By Arthur Forshaw, M.Sc. 743
Wales and Monmouthshire Junior Gas Association—
Manufacture and Condensation of Carburetted Water Gas. By Terence H. Madden 748

PARLIAMENTARY INTELLIGENCE.

House of Lords—
Gas Undertakings Bill 749
House of Commons—
South Suburban Gas Bill 749

MISCELLANEOUS NEWS.

Brighton and Hove General Gas Company—Quarterly or Monthly Accounts? . . . 750
Lea Bridge District Gas Company—Annual General Meeting 750
North Middlesex Gas Company 752
Service Records of Liverpool Gas Employees 753
Continental Union Gas Company, Ltd. . . 753
Amalgamation of Tunbridge Wells and Crowborough 753
Records Broken at Smethwick 753
Danger of Joint Use of Prepayment Meters . 753
The North-East Coast Exhibition—Rapid Progress 753

MISCELLANEOUS NEWS—(*continued*).

Gas Companies' Results for 1928—Steady Progress Maintained 754
London County Council and Gas Lighting . 756
Hastings Co-Partnership Meeting 756
Thames Conservancy and Land for the Gas Light and Coke Company at Staines . . 756
Coal Trade Reports—
North-East Coast 756
Yorkshire and Lancashire 756
Midlands 756
Trade Notes 757
Contracts Open 757
Current Sales of Gas Products 758
Stock and Share List 759

PARAGRAPHS.

Cornish Association of Gas Managers—Technical Institutes and Education . . 724
"Chemical Engineering and Chemical Catalogue" 729
Inquest on Chandelier Tragedy at Sheffield—New Lamplighting System for Bradford . 731
New Gasholder for Ballymena—Proposed Extensions at Coleraine—Newcastle Company's Year Book—Lectures on Gas Meters to Smethwick Employees—Coke Oven Gas for Glasgow—Bognor Stock Issue—Police Telephone Boxes for Gas Escapes—Report of the Maryborough (Queensland) Company—Report of the Wellington (N.Z.) Gas Company—Proposed New Showrooms for Blackpool 758

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